Running Head: ACADEMIC ACHIEVEMENT AND SCHOOL

ENGAGEMENT: THE ROLE OF PEER CULTURE

ADOLESCENT ACADEMIC ACHIEVEMENT AND SCHOOL

ENGAGEMENT: AN EXAMINATION OF THE ROLE OF STUDENT

PEER CULTURE

A dissertation submitted by

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In partial fulfillment of the requirements

for the degree of

Doctor of Philosophy

in

Child Development

TUFTS UNIVERSITY

May 22, 2011

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Abstract

A link between peer relationships and academic outcomes can be observed as early as elementary school (Buhs 2005; Kindermann, 2007). During adolescence, peers become a particularly salient context in the lives of students, rivaling the role of parents in their ability to influence youth outcomes (Brown & Larson, 2009). This manuscript expands on extant research, which identifies significant links between adolescents' immediate peer groups and academic outcomes, proposing that within each school exists a school-wide peer culture that is comprised of two interacting components (a relational and a behavioral component) that are related to individual academic outcomes. The relational component of peer culture describes students' perceptions of the quality of peer relationships within each school. The behavioral component is an aggregate representation of students' actual behaviors in regard to academic tasks (e.g., engagement in the classroom, Grade Point Average).

Using two data sets, the 4-H Study of Positive Youth Development (4-H Study), and the National Longitudinal Study of Adolescent Health (Add Health), I explored the idea that during adolescence, the relational and behavioral components of a school's peer culture are related to students' academic achievement and school engagement. Results suggested that above and beyond a variety of individual, familial, peer, and school characteristics that have previously been associated with academic outcomes, aspects of behavioral peer

culture are associated with individual achievement while components of both

relational and behavioral peer culture are related to school engagement. These

results are discussed in light of recent developments in adolescent intervention

strategies and school reform.

Acknowledgements

I would first like to thank my committee members – Richard Lerner, Tama Leventhal, Jon Zaff and Rebekah Coley. With little offered in return, you have each given your time, effort and thought to this dissertation. I am incredibly grateful for your feedback, your generosity, and your willingness to help see me through this process. I remember when I was very young my mother, an 8th Grade English teacher, tried to explain that major league baseball players have higher salaries than teachers. At the time, I just could not understand how individuals who shape student's learning and guide them to become contributing members of society could possibly be paid less than baseball players. This sentiment still rings true today – in my opinion, teachers and mentors such as yourselves are cornerstones of our educational system and deserve so much more than you are often given.

Throughout my graduate career I have been surrounded by mentors who have taught, supported, and challenged me. Rich Lerner has been an unflagging supporter and champion. I began my graduate career with Rich thinking I would surely drown in the depths of developmental methodology and theory. But week after week Rich guided, pushed, and nudged me steadily towards where I am today – preparing for graduation with confidence in my abilities and ready to add my own theoretical models to the literature. Tama Leventhal, my true role model as a woman who has a family and a successful academic career, always pushed

me to be my best and then take one more step. She has supported and guided me through publications, conference presentations, job searches, and the art of putting a new diaper down before you take the old one off. And Fran Jacobs, a mentor and a friend who seemed to understand me and my goals from the first day we met and helped me find my path through graduate school.

A meager "thank you" seems so insufficient for my husband, Mike, who met me a few months before graduate school began in 2004 and has never once faltered in his support, his enthusiasm for my work, and his encouraging me to feel proud of what I have accomplished. Mike made every challenge appear less daunting, and every milestone more exciting. I am constantly humbled by his goodness and feel thankful everyday that I somehow convinced such an incredible person to marry me. My parents, Bob and Monique Doyle – who knew all those nights of making sure I did my homework would lead to this? You have literally, figuratively, emotionally, and physically supported me every inch of this path. I can remember your teaching me to read, write, add, subtract. And now, you have provided me with the free child care that has allowed me to attain two of my long-term dreams – a family and a graduate degree. And of course, I must thank my little Addy, who helped added a new sense of purpose and to this process and simultaneously kept me from taking it too seriously.

And what would graduate school be without friends to keep you from pulling your hair out, who respond to email questions at a moment's notice and

who make you look forward to coming to school each day? To name a few – Deb

Bobek, Michelle Boyd, Aerika Brittian, Jennifer Davison, Kristen Fay, Sonia

Issac, Yibing Li, and Marie Pelletier – you always made me laugh and supported

me each day, helping to make even the most stressful moments feel a whole lot

lighter.

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Chapter 1

PROBLEM STATEMENT

Effective school reform requires acknowledging the school "system," which includes the school's leadership, teachers, parents, and the larger community in which the school is embedded (Sarason, 1991). As such, school reform needs to reflect an understanding of how change can occur in light of the cultural characteristics of the system in which it is being implemented. An essential component of the school system, which is often overlooked, is the students themselves. Each day, youth across the United States bring to school an abundance of individual skill sets and the potential for leadership. These youth constitute the peers of an adolescent, a group that becomes a salient influence on an individual's attitudes, behaviors, and emotions (Brown, 1990; Brown & Larson, 2009). Accordingly, if their influence can be better understood and guided, peers represent a potentially significant means to enhance adolescents' academic achievement and engagement.

The link between peers and academic outcomes can be observed beginning as early as elementary school (e.g., Buhs, 2005; Kindermann, 2007). Negative peer relationships and experiences of peer rejection have been linked to youth's academic failure, disengagement and high school drop out (Buhs, 2005; Ollendick, Weist, Borden, & Greene, 1992; Veronneau, Vitaro, Pedersen, & Tremblay, 2008; Wentzel & Caldwell, 1997). On the other hand, positive

experiences with peers have been associated with increases in students' academic engagement and motivation (Cook, Herman, Phillips, & Settersten, 2002; Ladd, Kochenderfer, & Coleman, 1996; Kindermann, 2007). In all, this research suggests that peers may play a role in adolescents' academic functioning that rivals that of administrators, parents, and teachers.

Much of the research regarding peer influences on academic outcomes has focused on interactions occurring at the dyadic (e.g. "best friends") or group level. However, recent research regarding the role of social networks (e.g., Christakis & Fowler, 2007; Haynie, 2001) and school-wide social culture (Hamm & Faircloth, 2005; 2003) suggests that, within schools, there may be an additional higher-order effect of peers that can be classified as a school-wide peer culture. Just as smaller peer groups have cultures and norms that members are expected to follow, the peer culture of a school likely similarly establishes attitudes and expectations that can influence individual student behavior.

Little research to date effectively examines the idea that a school may have an overarching peer culture that can alter student academic performance. The research that has been done, however, offers evidence of the potential strength of a school's peer culture. For example, Obgu (2003) found that groups of students within a school can create a peer sub-culture that discourages academic engagement and ultimately obstructs individual educational attainment throughout the duration of high school and beyond. Hamm and Faircloth (2005)

demonstrated that when a school's social climate is defined by exclusive cliques, students' feelings of connection to their school are significantly diminished.

The current study proposes that, in addition to peer influences that occur within smaller friendship groups, within each school there exists a larger, school-wide peer culture that can influence student academic performance. I argue that two primary components of peer culture are related to individual academic outcomes. First, the relational component of peer culture describes norms and expectations for student interactions that promote cohesion or unrest among the student body and help determine whether students' experiences with peers outside of their immediate friendship groups are generally positive or negative. Second, the behavioral component of peer culture refers to attitudes and behaviors that demonstrate the value students' place on academic achievement and engagement.

If the idea that a peer culture can be identified within each school is validated, a next step will be to consider the mechanisms through which peer culture may be associated with individual outcomes. One possibility is that the processes of selection, socialization, and indirect influence that many researchers have observed at the peer group level will play out similarly at the school level. According to Ryan (2000), in the process of selection, adolescents make decisions regarding the composition of their peer group based on pre-existing individual characteristics. Socialization occurs when individuals within a peer group begin to look more similar over time as they come to model characteristics that the

group favors. Peers socialize attitudes towards academic attainment by demonstrating school-related behaviors and attitudes, which subsequently alter the behaviors and attitudes of an individual. I hypothesize that the two components of peer culture will work to socialize messages regarding the value of academic attainment and establish standards for student interactions. The quality and character of these interactions will be both directly and indirectly associated with students' academic functioning.

The present study used the 4-H Study of Positive Youth Development (4-H Study) and the National Longitudinal Study of Adolescent Health (Add Health) to examine how a school's peer culture may be related to individual academic outcomes. The use of two large-scale, national data sets is significant for several reasons. First, given what little research is available regarding school-wide peer culture, replicating findings across studies enhances the validity of results. Second, each study offers a different approach for understanding the concept of peer culture. The 4-H study included data from 5th and 6th Grade students, allowing me to examine the role of peer culture at the very beginning of adolescence. Add Health provided a peer network perspective, allowing observation of friend's actual behaviors, and assessment of the relationship between the peer culture and peer group characteristics. Finally, the two studies combined provided a perspective that spans the entire period of adolescence. The 4-H Study data ranges from 5th to 6th Grade while Add Health allowed

examination of the role of peer culture from 7th Grade through high school graduation.

The 4-H Study tested the hypothesis that peer culture in Wave 1 is related academic achievement and engagement in Wave 2. Analyses of the Add Health data set controlled for the effects of peer group characteristics in a peer culture's process of socializing messages regarding academic attainment. I hypothesized that a positive peer culture, defined by high quality friendships within the school, would be positively associated with academic attainment and engagement. In addition, in schools where the peer culture sends favorable messages about academic engagement and achievement, there would be a positive, significant relationship between peer culture and academic attainment.

It sum, it was hypothesized that within each school, there exists a peer culture that is a product of both student relationships and students' academic behaviors and attitudes. These characteristics of the student body are significantly related to individual student achievement and school engagement. The current results documented the presence of a peer culture within schools and gives weight to the argument that student relations need to become a more central focus in efforts at school reform. Efforts such as academic tutoring programs, revised curriculums, teacher workshops, and parental involvement, will do little to alter student outcomes if a school's peer culture is not working in synchrony with the school's goals.

Chapter 2

LITERATURE REVIEW

There are several major transitions that occur during the adolescent period. One is a shift towards utilizing peers, rather than parents and family, as the primary source of social interaction (Brown, 1990; Brown & Larson, 2009). As such, during adolescence, peers begin to exert a new level of influence on a young person's behavior and development. When considering the significance of peer relationships during adolescence, a large body of literature demonstrates links between adolescent peer influences and delinquent behaviors (e.g., Dishion, Spracklen, Andrews, & Patterson, 1996; Downs & Rose, 1991; Haynie, 2001; Urberg, Goldstein & Toro, 2005). However, a second, growing area of inquiry suggests that adolescents' peers may play an equally significant role in influencing school-related behaviors such as academic success, school engagement, and achievement motivation (e.g., Cook, Deng & Morano, 2007; Kindermann, 2007; Riegle-Crumb, Farkas, & Muller, 2006, Wentzel & Caldwell, 1997).

Research suggests that during adolescence, peers can both promote and discourage academic attitudes and behaviors that contribute to school success. Over time, peer group academic achievement and engagement serve as significant predictors of changes in individual scholastic goals and attainment (Crosnoe, Cavanaugh, & Elder, 2003; Guay, Boivin & Hodges, 1999; Kindermann, 2007;

Riegle-Crumb, Farakas, & Mueller, 2006; Wentzel & Caldwell, 1997).

Furthermore, peer effects on academic behaviors seem to persist even when

controlling for factors that have been previously linked to adolescent academic

outcomes, such as parent and teacher inputs (Hanushek, Kain, Markman, &

Rivkin, 2003; Kindermann, 2007). Initial evidence also suggests that among the

pool of potential peer influences, peers' academic achievement is the strongest

predictor of not only academic behaviors but also social behaviors, and drug use

(Chen, Chang, & He, 2003: Cook et al., 2007).

Methodological and statistical advances have allowed researchers to use

these findings a step further and begin to look at how academic attributes can

spread among individuals within the same peer group. This work suggests that

students first tend to select peers who demonstrate similar levels of academic

achievement and school engagement. Once peer groups are formed, these

characteristics are further socialized such that individuals within a peer group

begin to look more similar over time (Ryan, 2000). As a result, groups of

students that have specific academic profiles, represented, for example, by the

aggregate level of achievement or engagement of all group members, begin to

emerge within schools. These profiles of peer group behavior have been linked

with changes in individuals' Grade Point Average (GPA), their decisions to take

advanced coursework, and their feelings of connection to school (Kindermann,

2007; Reigle-Crumb et al., 2006).

While the majority of the work examining the links among peers and academic behaviors has focused on the role of friendships and individuals within adolescents' immediate peer groups, several researchers have expanded this definition of "peers" to take account of a broader range of individuals – including individuals with whom an adolescent may have no direct friendship ties (e.g., Cacioppo, Christakis, & Fowler, 2009; Ennett & Bauman, 1996; Haynie, 2001). This line of inquiry suggests that it is not only within immediate peer groups that profiles of school behaviors and attitudes can be found. Rather, group profiles can also be found among larger groups of individuals, such as students within the same classroom or students within a school who have the same racial background (Ali & Dwyer, 2010; Mayberry, Espelage, & Koenig, 2009; Ogbu, 2003). And, indeed, the profiles of these higher-order groups of individuals have been associated with individual outcomes (Nelson & Debacker, 2008; Osterman, 2000). For example, schools where adolescents perceive high amounts of hostility in peer interactions are more likely to have less engaged students than in schools where student interactions are less hostile (Ripiski & Gregory, 2009).

This research as a whole suggests that, in addition to an individuals' immediate peer group, larger, more broadly-defined peer groups of which that the individual is a member can also contribute to an adolescent's feelings towards school and achievement. The present study examines the validity of the idea that within each school, there exists a school-wide profile of peer relationships and

peer behavior that may be related to individual academic outcomes. It is theorized that this school-wide peer profile, which will be referred to as a school's "peer culture," establishes the acceptability of specific academic behaviors and attitudes and determines the tone of student interactions and relationships. Each school's peer culture is comprised of two components. The relational component of peer culture reflects students' perceptions of the quality of peer relationships aggregated at the school level. The behavioral component is a measure of students' actual behaviors in relation to academic achievement and engagement aggregated at the school level.

While there is not a current body of literature that specifically looks at the concept of peer culture, extant research in regard to peer relationships, school climate, social networks, and neighborhoods and communities, provides a background to develop our understanding of this concept. Indeed, the study of peer culture does not require an entirely new line of inquiry and literature. Rather, there are several areas of investigation where peer culture dovetails nicely with current research and theory. In this review, I will first describe the concept of peer culture in further detail and examine extant research and theory that supports the premise that school-wide peer cultures may contribute to individual academic outcomes. Next, I will present a theoretical model that demonstrates how peer culture may transmit influence at the level of the individual. This model

also will serve as a framework for the development of an empirical investigation of the relations between peer culture and individual academic outcomes.

Conceptualizing Peer Culture

The idea of peer culture suggests that, in addition to what is happening at the level of the peer group, there is a higher-order effect of peer behavior and the nature of peer relationships *in general* within a school that is related to individual outcomes. The proposed model of peer culture is comprised of two primary components. The first component encapsulates student perceptions of peer interactions within a school. The second proposed component of peer culture is the higher-order effect of students' behaviors within a school. The important distinction between this component and the first component of peer culture being that the first component deals with student *perceptions of relationships* while this second component refers to actual student *behaviors*. Because this manuscript focuses on academic outcomes, this second component of peer culture will be operationalized as students' academic behaviors and attitudes aggregated at the school level (although this behavioral component of peer culture could be operationalized by any outcome of interest – civic engagement, alcohol consumption, delinquency).

In this section I will review the proposed relational and behavioral components of peer culture in greater detail. Research from several fields will be drawn on to inform our understanding of these two components of peer culture.

While the adolescent peer relationship literature provides a foundation from which the idea of peer culture can be explored, theories from several additional areas including school climate, social networks, and neighborhood research are needed to complete our discussion of peer culture as a higher-order force that exists within schools.

Component 1: Students' perceptions of peer relations aggregated within a school

The first component of peer culture that is hypothesized to predict student outcomes can be described as the higher-order effect of student perceptions of peer relations within a school. This component summarizes how students as a whole view the quality, fairness, and general positive or negative nature of school-wide peer relations. This relational component of peer culture should not be conflated with student's individual opinions of student relations. The focus here is not on the relations among students' individual perceptions and their academic outcomes. Rather, the focus is on understanding how the overall perceptions of student relations within a school (e.g., student relations are predominantly positive or predominately negative) are related to individual academic achievement and school engagement.

It is important to note that this concept is distinct from students' perceptions of their immediate friendships. That is, peer culture is a measure of how students view the overall quality of peer relations within a school, not how

students perceive their immediate friendships. While students' friendships are likely to help shape their perceptions of peer culture, it is entirely possible for a student to report positive relationships with his/her immediate peer group, but view the overall quality of peer relationships within a school to be quite poor.

While the peer relationship literature describes the significance of peers during adolescence and the links between peers and academic success, this work does not typically describe the higher-order effects of student perceptions within schools. Much of the peer relationship literature describes relationships and influences at the individual or group level. The study of how relationships at the individual or group level are working does not fully inform our understanding of how the overall tone of peer relationships within a school are operating at the aggregate, school level. However, there is some initial evidence to support the idea that student perceptions of peer relations in a school are related to academic outcomes. For example, students' perceptions about feeling support and respect from peers are associated with their academic motivation and engagement (Nelson & DeBacker, 2008; Shin, Daly & Vera, 2007). Students' feelings of connection and relatedness to peers also have been associated with their school achievement and engagement (Anderman & Anderman, 1999; Birch & Ladd, 1996; Furrer & Skinner, 2003). It should be noted, however, that this work varies greatly in its methodological approach and rigor.

One area that has successfully examined and documented the role of higher-order perceptions within a school is the field of school climate research. School climate is generally defined as the collective sentiments of individuals within a school in regard to a variety of school contextual factors (e.g., Glisson & James, 2002; Stewart 2003). Theorists have conceptualized school climate as the aggregated perceptions of individuals within a school in regard to achievement (e.g., Ogbu, 2003), treatment of students (e.g., Mayberry, Espelage, & Koenig, 2009), student-teacher relationships (e.g., Buyse, Verschueren, Verachtert, Van Damme, 2009), school safety (e.g., Ripiski & Gregory, 2009), and quality of the school environment (e.g., Barboza et al., 2009). These examinations of school climate rely on reports from a variety of informants, including opinions from teachers, students, and administrators, as well as on collective perceptions of all individuals within a school.

In general, there seems to be a lack of agreement regarding *what* school climate is and *whose* report should be relied on. Indeed, according to the current state of the literature, school climate can be considered to encompass student and teacher perceptions in regard to a wide variety of school-related contextual characteristics. One area that appears to be glaringly missing from examinations of school climate, however, is the study of students' relationships with their peers. This gap is where the currently hypothesized concept of peer culture may fit. Peer culture aligns with the general definition of school climate – it reflects the

aggregate opinions of individuals (students) within a school in regard to a specific aspect of the school context (peer relationships and student attitudes). As such, one way to view peer culture is as an aspect of school climate that contributes to the quality and nature of students' day-to-day experiences and their ultimate school success.

In all, school climate research informs our understanding of how individual perceptions aggregate within a school and how these school-level influences are associated with individual academic attainment. Research has linked aspects of school climate to a variety of student outcomes ranging from academic outcomes to engagement in bullying and delinquent behaviors (Barboza et al., 2009; Ripiski & Gregory, 2009). A few studies have even begun to consider aggregate perceptions of student relations (e.g., Barboza et al., 2009); however, methodological limitations (which will be discussed in further detail below) of these studies may have prevented the identification of significant findings. While no school climate research to date specifically links higher-order perceptions of peer relations to individual academic outcomes, this literature provides an important base for understanding our conceptualization of peer culture and demonstrating the importance of higher-order perceptions in relation to student outcomes.

One of the most commonly pursued issues among school climate researchers is the link between school climate and student delinquent, violent, and

aggressive behaviors. For example, Barboza et al. (2009) used an ecological

perspective to examine the role of individual, familial, peer, school, and media in

increasing youth's odds of engaging in frequent bullying behaviors. Here, the

authors defined school climate as students' perceptions that their school was a

nice, pleasant place to attend and that teachers treated students fairly. Results

suggested that for every standard deviation increase in students' perceptions of a

negative school climate, the odds of being a bully increased by 44%. This study

in particular highlights the potential strength of the relationship between school

climate and student outcomes. In their analyses, the authors took into account the

effects of individual, family, and peer characteristics and found that school

climate continued to play a role in bullying behavior above and beyond the

influence of these other factors.

Of particular relevance to the present study is research that considers the

relations among school climate and adolescent academic outcomes. In general,

work in this area suggests that school climate may have enduring associations

with student achievement and engagement. For example, Ripiski and Gregory

(2009) considered the links among collective perceptions of student violence and

hostility and school engagement. The authors found that collective perceptions of

negative school climate (defined as perceptions of unfairness, hostility, and

victimization) were associated with low school engagement among students.

Schools where adolescents perceived high levels of hostility were more likely to

have students who were less engaged than schools where adolescents felt students were less hostile. In addition, school-wide perceptions of hostility were also negatively associated with students' reading achievement scores. These findings provide support for the currently proposed relationship between a second aspect of school climate (peer culture) and academic outcomes.

In a study of elementary school students, Buyse, Verschueren, Verachtert, and Van Damme (2009) examined the associations among relational qualities of students' first grade classrooms (levels of student-teacher closeness and conflict) and students' school adjustment (aggression, popularity, well-being, reading and math achievement) from first to third grade. Youth whose first grade classrooms were defined by high levels of closeness among students and teachers demonstrated positive school adjustment. Alternately, youth who were in classrooms where the relational climate was defined by high levels of conflict demonstrated poorer school adjustment than youth whose first grade classrooms had lower levels of conflict. This research replicates and expands findings from the Ripiski and Gregory (2009) study by again demonstrating the importance of school climate in relation to student scholastic outcomes. In addition, the study further suggests that the role of school climate may begin as early as elementary school.

While several studies have looked at the role of perceptions of a schools' academic climate, adult involvement, and student-teacher relationships, very few

studies have assessed perceptions of student relations as an aspect of school climate. In one of the few studies that considered the role of student perceptions of student relations, Barboza et al. (2009) measured the role of broader peer relationships within a school in predicting bullying behaviors. Their measure of broader peer relationships assessed whether students felt that other students treated them fairly, whether they enjoyed being with other students and whether they felt accepted. Analyses found that students' perceptions of the broader peer relations in a school did not significantly predict an individual's odds of engaging in bullying behavior. It is important to note, however, that this study did not aggregate student perceptions of a school's broader peer relations at the school level. As such, this operationalization of broader peer relations does not accurately meet the definition of a school climate variable, nor does it meet the current definition of the relational component of peer culture. If the authors had used aggregate perceptions of student relations, the results would have been able to demonstrate whether in schools where individuals perceived that broader peer relations are positive, students were less likely to engage in bullying.

In general, the extant research regarding school climate highlights several important issues that should be considered in our conceptualization of the relational component of peer culture. One of the most obvious lessons that can be derived from the current school climate literature is the fact that relations among components of school climate and student outcomes vary according to how school

climate is defined and the outcome of interest. For example, in the same study that identified students' sense of school community as a moderator of the relationship between peer influence and substance use, Mayberry, Espelage, and Koenig (2009) also tested the effects of school climate (defined as students' perception that they are getting a good education and that they are treated fairly in school). Results indicated that, under this definition, school climate did not moderate peer influences on substance use. As such, it is apparent that while many researchers say they are assessing "school climate," there is a wide range of definitions that are being used. Discrepancies in findings across the literature may be an artifact of the lack of agreement regarding how to define school climate.

Current research also brings attention to the need to consider carefully the population being studied when determining the appropriate means of aggregating perceptions within a school. Researchers have aggregated perceptions at the level of the classroom and at the level of the school. For example, Buyse et al. (2009) aggregated perceptions at the classroom level, whereas Ripiski and Gregory (2009) aggregated perceptions at the school level. This distinction highlights an important difference that should be acknowledged when studying younger versus older students. Among elementary school students, the classroom level may be the most appropriate level of aggregation because these students spend the majority of their day in the same classroom with the same individuals.

Adolescent students, however, tend to move throughout the school to different classes throughout the day. As such, when determining the most appropriate method of aggregating perceptions, the developmental level of participants should be an essential deciding factor.

While none of the school climate research has successfully tested the current relational component of peer culture, this work provides an excellent foundation from which our exploration of peer culture can begin. Lessons from extant research regarding the role of school climate in student outcomes include the need to acknowledge the importance of carefully considering how school climate concepts are defined and operationalized and to test the relations between school climate and a variety of outcomes.

Component 2: Aggregated effects of students' academic behaviors within a school

In the proposed model of peer culture, it is not just students' perceptions of peer relations within a school that are hypothesized to be related to their academic outcomes. Rather, it is theorized that a second equally important component of peer culture is the higher-order effect of students' actual academic behaviors. The behavioral component of school culture is represented by reports of student behaviors aggregated at the school level. Depending on the outcome of interest, this component of the model can be represented by a variety of behaviors – drug/alcohol use, civic engagement, or extracurricular participation. Here, since

the outcome of interest is students' academic behaviors, the proposed behavioral component of peer culture will be represented as students' academic behaviors (e.g., achievement, school engagement) aggregated at the school level.

Several bodies of literature provide theory and research that contribute to our understanding of the higher-order role of student behavior. School climate research, which formed the foundation for our understanding of the relational component of peer culture, is conceptually useful, in that it suggests the spread of ideas and attitudes at the school level, however, this literature focuses primarily on perceptions not behaviors. On the other hand, research regarding social networks is more relevant to the behavioral component of peer culture because much of the work in this area specifically examines the dissemination of *behaviors* among a large body of individuals. The behavioral component of peer culture shares many features with social network theory. Both theories examine how behaviors can influence behaviors (as opposed to attitudes or perceptions influencing behaviors). Both theories are also interested in examining the diffusion of behaviors among individuals.

It is important to note that the social network literature is divided into two different approaches for defining social networks. In the first approach, social network researchers track the diffusion of behaviors among individuals who have direct social ties, such as students who are in the same class or individuals who have identified one another as friends (e.g., Ali & Dwyer, 2010). Here,

researchers are typically interested in looking at the effects of group-level aggregated behaviors. I will refer to this approach as the aggregation approach in subsequent portions of this dissertation. In the second approach, researchers have maintained the basic principle of tracking the dispersion of behaviors among individuals with indentified social ties, but have moved beyond first degree relationships (e.g., mutually-nominated friends) and also included "friends-of-friends" and several additional degrees of separation (e.g., Cacioppo, Christakis, & Fowler, 2009). In this approach, effects of individuals within a group are typically not aggregated. Rather, the focus is on the spread of a behavior from individual to individual. I will refer to this approach as the network approach in subsequent paragraphs.

The behavioral component of peer culture can be seen as a hybrid of the aggregation and network approaches. The behavioral component examines how the typical behaviors of a school's student body relate to the behaviors of an individual. In other words, it examines individuals who are linked by their attendance at a specific school and it aggregates behaviors at the group level to consider how group-level behaviors are related to individual behaviors. The behavioral component of peer culture, however, does not limit the study of the dispersion of behavior to individuals with direct social ties. If one considers a typical student body, it is clear that students may attend the same school, but it is likely that (especially in larger school systems) many students within the same

school will have had no direct interactions. In this sense, the behavioral

component more closely mimics the network approach to social network research,

which examines the influence of individuals with several degrees of separation,

who may never have been directly in contact with one another. Research from

both approaches to social network theory can guide and offer support for the

conceptualization of the behavioral component of peer culture.

Among studies that have used the aggregation approach to social

networks, there has been a generous amount of support for the idea that the

higher-order profile of a group predicts individual outcomes. The most common

application of this method is to consider the role of adolescent peer group

behavior in predicting the behavior of individual peer group members. Recent

research along these lines has used advanced techniques to control for the role of

selection biases and to isolate the effects of aggregated group-level behaviors.

Such studies have documented links between peer group-level alcohol use and

individual alcohol use (Urberg, Goldstein, & Toro, 2005); peer group

homophobic sentiments and individual homophobic sentiments (Poteat, 2008);

and peer group school engagement and course selections and individual

engagement and course selection (Kindermann, 2007; Riegle-Crumb et al., 2006).

Although these studies use much smaller, more isolated groups to examine the

transmission of behavior than is proposed in the current model of peer culture

(which proposes an entire student body as the point of group aggregation), the

findings support the basic concept of peer culture, which theorizes that groups can develop profiles of behaviors that can influence individual functioning.

Only a few studies also have used a hybrid approach similar to what I have proposed in the behavioral component of peer culture. For example, Ali and Dwyer (2010) examined the relations between alcohol consumption among classmates (i.e., students within the same grade) and individual alcohol use among students from 132 schools across the United States. The authors' examination of the link between classmates' behaviors and individual behavior is analogous to the behavioral component of the proposed model of peer culture. The authors aggregated the drinking behaviors of all the students within a grade and considered the association between students' aggregated behaviors and individual behaviors. Results suggested that drinking behaviors among classmates were related to individual drinking participation and drinking intensity. In an interesting juxtaposition, the authors also examined alcohol use among nominated peers (i.e., youth who individuals identified as "friends" on a peer nomination form) and individual alcohol use. The authors found that drinking behaviors among nominated peers predicted participation in alcohol use, but not the intensity of alcohol use. As such, it seems that classmates' behaviors were more important in predicting individual drinking behaviors than the behavior of nominated peers. This finding offers intriguing support for the peer culture model, suggesting that the behaviors of one's classmates may play a greater role

in student outcomes than the behaviors of friends in direct peer groups. In addition, it draws attention to the idea that the peer culture and the friendship group may be working in a symbiotic relationship. The friendship group played a role in the initiation (use) of alcohol while classmates set the tone for how alcohol use played out once initiated (intensity).

Social network models that use the network approach to study the dissemination of behavior are important in the conceptualization of the behavioral component of peer culture in that they illustrate that a group of individuals can demonstrate a collective behavior (or emotion) and that this collective behavior can, in turn, can be associated with the behavior of an individual. In a series of studies using a network approach to the study of social networks, Christakis and Fowler (2008) examined the spread of emotions and behaviors throughout a large group of individuals participating in the Framingham Heart Study whose familial and friendship networks had been tracked over the course of several decades. This work demonstrates the spread of characteristics and behaviors such as happiness (Fowler & Christakis, 2008), obesity (Christakis & Fowler, 2007), and smoking (Christakis & Fowler, 2008). In one such study, the authors examined the spread of loneliness among participants (Cacioppo, Fowler, & Christakis, 2009). They found that the effect of loneliness extended up to three degrees of separation within the social network. Loneliness was found to be both a function of the individual and a property of groups of people. That is, people who were

lonely were often closely linked to others who were lonely. Furthermore, non-lonely individuals who were surrounded by lonely individuals tended to grow lonelier over time.

It is also significant to note that the individuals in the Framingham Heart Study are located throughout the United States. They do not have a single unifying setting (such as a school) in which they gather each day. If loneliness is able to spread across such a large, geographically-separated network, it is not difficult to imagine that behaviors such as academic achievement and school engagement could easily spread among a group of individuals who are isolated in a single physical space day after day.

While Christakis and Fowler's examinations of social networks and the current model of peer culture enjoy several similarities, the concept of peer culture differs from Christakis and Fowler's model in that it considers the collective behaviors of an entire group and how this collective behavior influences the individual, whereas Christakis and Fowler's work focuses more on demonstrating the spread of behaviors from individual to individual. The reason for this differentiation is that the social network referred to in the study of peer culture is not an infinite body of people. It is a discrete group defined simply by its attendance at the same school. The fact that a student body is gathered in one setting and interacting on a daily basis greatly alters the potential for the dissemination of behaviors within this group. It is likely that in a school setting,

behaviors are much more salient because they are able to be viewed more frequently. In addition, behaviors are likely to spread more rapidly in such a setting simply due to the persistent close physical proximity of all individuals within the network.

Connecting the Behavioral and Relational components of Peer Culture

Up to this point, the behavioral and relational components of peer culture have been described as separate entities. However, a key concept in the theory of peer culture is the fact that the relational and behavioral components work together in a systematic fashion. Perceptions of peer relationships will be related to the strength of the behavioral messages the peer culture sends and determine whether students attend to these messages. In the case of academic attainment, there are four core possible combinations of possibilities. Table 1 presents these scenarios.

Insert Table 1 about here

It is hypothesized that in Scenarios 1 and 2, where students' perceptions of peer relationships are generally positive, the peer culture will have the strongest relationship with student outcomes. Notice that Scenarios 1 and 2 differ in terms of the behavioral messages that are sent in regard to academic achievement. This difference is important. Regardless of the positive or negative nature of the

academic messages, it is hypothesized that positive perceptions of peer relations will bolster the strength of that message. As such, a peer culture needs to pair favorable perceptions of student relationships with behavioral messages in support of academic attainment in order to see a improvements in individual academic attainment.

In the case of Scenarios 3 and 4, where perceptions of student relationships are unfavorable, there are a few different dynamics that may play out. It is possible that in such an environment, the behavioral messages regarding academic achievement will not be related to individual behavior. In a situation where students do not feel supported by their peers, it is likely that messages from these peers may be disregarded. On the other hand, a negative perception of peer relations within a school may have an indirect relationship with individual academic outcomes. Perhaps a negative peer environment may act on students' psychological well-being, increasing depressive symptoms and feelings of loneliness. In such a case, the relationship between a negative peer environment and individual academic attainment interact with a student's emotional functioning. Further discussion of the potential for interactions between peer culture and individual and contextual characteristics can be found in the next section. Please see Figure 1 for a graphical example of the proposed interaction between relational and behavioral peer culture.

Insert Figure 1 about here

Support for the idea that behaviors may be more likely to be successfully socialized in the presence of a positive peer culture comes from several areas of research. One theory that can shed light on this idea is Dishion's theory of deviancy training (Poulin, Dishion, & Haas, 1999). Dishion predicts that when delinquent youth are placed together and subsequently form friendship bonds, maladaptive behaviors may actually increase. To test this theory, Dishion observed adolescents enrolled in an intervention program designed to decrease problem behaviors (Poulin et al., 1999). Youth enrolled in the intervention program demonstrated significantly more delinquent and problem behaviors than controls. These iatrogenic effects of peer influences from the intervention period persisted for several years. In line with Dishion's theory, it may be that a peer culture that combines negative behavioral messages and positive perceptions of peer relations may actually have iatrogenic effects on student achievement.

Ogbu (2003) observed similar relations among African American youth living in an affluent suburb, Shaker Heights. The Shaker Heights community was concerned that their African American students demonstrated consistently poorer achievement than European American students in the district and called upon Ogbu to conduct a year-long ethnographic analysis of the school system. His

highly controversial results suggested that African American students were part of a tight-knit peer culture that devalued the importance of academic achievement. Within this culture, there was pressure for students to neglect academic responsibilities and display negative attitudes towards education. These findings mirror Dishion's theory of deviancy training, suggesting that in the presence of a supportive peer environment, negative behaviors can be successfully disseminated.

Work investigating the effects of social environments within classrooms can also offer insight into the potential interaction between the relational and behavioral components of peer culture (e.g., Eccles, Midgley & Adler, 1984). Such research highlights the role of a classroom's social climate in determining how peers socialize messages regarding academic achievement. Ryan and Patrick (2001) found that the perceived social environment of classrooms significantly alters students' academic engagement and motivation. In classrooms where students perceived they had mutually respectful interactions with peers, increases in perceived academic efficacy were observed. Alternately, another study demonstrated that in classrooms where social comparisons were encouraged (i.e., where students were encouraged to gauge how well they were doing by comparing their achievement to their peers' achievement), students were less engaged and selected less effective learning strategies (Ames & Archer, 1988). As such, in a school where the overall social environment is one that encourages

academic cooperation among students, the socialization of positive academic behaviors may be promoted.

How Does a School's Peer Culture Influence Individual Outcomes?

Given that a fair amount of theory and research supporting the idea that there exists a school-wide peer culture, the next step is to understand the mechanisms through which peer culture may be related to individual academic experiences. Since the concept of peer culture has not yet been studied, there is no research that directly describes how the aggregate perceptions and aggregate behaviors of a student body may be associated with individual academic functioning. However, a significant amount of research does exist that describes how both individuals and groups (e.g., peer groups, communities) can influence individual outcomes. We can draw on this work to create a model for understanding how peer culture may be associated with individual behaviors.

One of the primary theories that can help us to understand how peer culture transmits influence is Ryan's (2000) theory of selection and socialization, which is most frequently referenced in the peer relationship literature. There are also several important ideas from the neighborhood research literature, such as broken windows theory and the notion of collective efficacy, that can help to provide a general understanding of the transmission of influence in relation to peer culture and offer a more nuanced understanding of the processes of socialization at work within a peer culture.

In the following discussion, I will describe the aforementioned theories in greater detail and note ways in which they can contribute to our understanding of how both the relational and behavioral components of peer culture may be related to individual academic functioning. Here, however, it is important to note that the relational and behavioral components are hypothesized to transmit influence in slightly different manners. The behavioral component follows a more straight-forward path (and one that has received ample research and theoretical support). That is, in regard to the behavioral component, we are essentially examining how group behaviors influence individual behaviors. In terms of the relational component of peer culture, the situation is slightly more complex. In this case, we are interested in understanding how a group's perceptions of relationships work to influence individual behaviors.

Ryan's Theory of Selection and Socialization

When exploring the links among peers and individual outcomes, theorists often describe the transmission of influence as occurring through two processes – selection and socialization (Ryan, 2000). In the process of selection, adolescents choose their friends and peer group based on their pre-existing individual characteristics, such as goals and values derived from their families, culture, and personal experiences. For example, similarly achieving students tend to cluster together. High achieving students are more likely to form friendships with other high achieving students, while lower achieving students tend to become friends

with other low achieving students (Kandel, 1978). Socialization occurs when, over time, individuals within a peer group begin to look more similar as they come to model characteristics that the group favors and characteristics that are demonstrated to be adaptive in the larger context. For example, socialization occurs when peers provide an example of positive or negative academic achievement, engagement, or motivation, which subsequently alters the academic functioning of an individual (e.g., Altermatt & Pomerantz, 2003; Kinderman, 2007; Riegle-Crumb, Farkas, & Muller, 2006).

  While the processes of selection and socialization were originally theorized to apply to individuals within smaller groups of peers and in dyadic relationships, it is likely that these processes are also at work within a school's peer culture. Let us first consider the process of selection. In the case of peer culture, the student does not necessarily play an active role in determining the school he/she will attend and the peer culture of which he/she will be a part. Rather, here, selection is working more in terms of the social, cultural, and economic characteristics of the student's family that drew them to a specific town or prompted the family to send their children to a specific school. Throughout the rest of the manuscript, I will refer to this process of selection of a school (and therefore selection of the school's peer culture). To be clear, I am not suggesting that students are always actively selecting the school they attend (although this specificly does happen at times). Rather, I am more generally referring to the

sociocultural processes that draw certain families to select the communities in which they live and the schools that their children attend.

In our discussion of peer culture, the process of selection will not be addressed as thoroughly as the process of socialization. That being said, it is important to acknowledge the process of selection because it is essential to our complete understanding of peer culture. If a peer culture's higher-order behavioral profile is demonstrated to be related to individual behaviors, how can we say with any certainty that this relationship is due to socialization and not to the fact that schools tend to attract students with similar backgrounds and educational goals? In an empirical investigation of peer culture, the effects of selection will need to be addressed in any proposed model (Manski, 1993).

In terms of socialization, a school's peer culture will likely work by establishing behavioral norms and attitudes towards school-related behaviors that may be transferred to the individual via several mechanisms. First, it is likely that much of the influence from a school's peer culture will be transmitted directly to the individual. That is, students will observe their peers' behaviors in the classroom, their views regarding academic success as they are expressed both inside and outside of school, and their academic values as they are displayed in their treatment of students with varying levels of academic success. It is also likely that many of the peer culture's attitudes towards school-related behaviors will be filtered down to the individual via the peer groups within each school. In

other words, the peer culture may act directly on the individual, but it also will act indirectly by influencing the messages that an individual's peer group socializes. In this case, the peer group acts almost as an intermediary, further socializing the messages from the peer culture.

Socialization can be seen as the umbrella theory under which several of the subsequently discussed theories can be placed. The core idea in socialization is that behaviors and attitudes are being spread from one individual to another individual or disseminated from a higher-order group to an individual. If one views socialization as the dispersion of messages among individuals, broken windows theory, and collective efficacy, which are typically used to describe neighborhood processes, can be seen as more nuanced explanations of how exactly socialization is occurring.

Neighborhood Theories and Peer Culture

Neighborhood and community theories help us to understand how contextual characteristics of communities, as well as the higher-order effect of the characteristics of individuals within communities, work together to impact adolescent outcomes. A peer culture itself can be considered a community. It is comprised of individuals whose characteristics, values, and ambitions come together to dictate an overall style of interaction and support mutual goals and ideals. If we envision peer culture to be essentially a community of students within a school, many of the tenents of community and neighborhood theory can

aid our understanding of how peer culture may be associated with individual outcomes (see for example, Goddard, 2001; Plank, Bradshaw, & Young, 2009).

Broken windows theory (Zimbardo, 1969) is one such neighborhood theory that can provide insight into the mechanisms of action underlying peer culture. This theory suggests that there is an important relationship between the physical characteristics of a setting (e.g., school or neighborhood) and the behaviors of the individuals within that setting. When an environment is defined by physical disorder (e.g., broken windows, vandalism, etc.), the basic goals and expectations individuals in that environment can become negative. Zimbardo uses the analogy of a broken window to argue that when one window is broken in a building and left unrepaired, soon all the windows will be broken. Applying this idea to school settings, physical disorder could distract students, teachers, and staff from some of the primary functions of the school such as education and discipline.

Wilson and Kelling (1982) suggest two hypotheses explaining the link between the physical state of a setting and behavioral responses. First, they hypothesize that when a neighborhood is in physical disrepair, a message is sent that "no one cares" about the neighborhood or school. I will refer to this hypothesis as their "no one cares" hypothesis. As a result of this message indicating that "no one cares," these neighborhoods may be more likely to become the setting for criminal activity. The authors' second hypothesis, their

social control hypothesis, states that the physical disorder of a setting contributes to decreased efforts to maintain social control. This idea again leads to increased opportunities for criminal activity.

So what does the physical state of a setting have to do with a peer culture's transmission of influence? According to Wilson and Kelling's "no one cares" hypothesis, the physical disrepair of a setting sends the message to individuals that no one cares about the setting (in this case, a school). What is significant in this hypothesis is the idea that the *state* of an environment can send unspoken messages about how individuals within that setting should behave and whether or not the setting should be valued. Broken windows theory specifically addresses the physical state of a setting. However, just as the presence of broken windows, trash, and dangerous individuals makes a setting unwelcoming, so does the presence of a student body that treats students poorly and disrespectfully. If a student body perceives that relationships among students are poor and that students do not treat one another with respect, it sends the message that students (and possibly faculty for allowing disrespectful behavior among students) do not care about the individuals within the school. If the peer culture context is sending messages students are not valued, such a setting could be viewed as a student body that is in a state of disrepair. In line with broken windows theory, such a setting may beget behavior that goes against the primary goals of the institution such as academic disengagement, lackluster academic performance, and poor

student relations. Thus, the presence of a student body that treats students disrespectfully may prevent a school from being viewed as a setting for academic achievement.

According to Wilson and Kelling's social control hypothesis, the physical disrepair of a setting leads individuals to diminish their efforts to maintain social control. Consider a school where a student body is unengaged and low achieving and marked by conflict and disrespect. These behaviors could discourage teachers, students, and administrators to attempt to promote positive school performance. Overall, the pervasiveness of such behaviors throughout a student body could easily detract from the core educational values and goals that a school represents. Teachers and administrators who are faced with such a student body may experience frustration, burnout, and a lack of motivation due to unresponsive students (Frenzel, Goetz, Lüdtke, Pekrun, & Sutton, 2009; Klusmann, Kunter, Trautwein, Lüdtke, Baumert, 2008).

While peer culture does not address the physical state of the school, the basic principles of broken windows theory can still be applied. In a setting where the students are actively demonstrating positive academic behaviors, they are creating an environment in which the collective message is that students care about achievement and are dedicated to their studies. In turn, individual students will be more likely to view the school as a setting for achievement. Furthermore, a high achieving student body sends a message to teachers and administrators that

students value education and are interested in pursuing the educational values found in the school. As such, a highly motivated student body will likely provide positive reinforcement to teachers and administrators who engage students in the classroom and encourage learning (Klusmann et al., 2008).

Social organization theory also can contribute to our understanding of peer culture. A community's social organization or collective efficacy refers to the degree to which community members monitor one another's behavior and uphold social norms. According to theories of social organization, the social cohesion and organization of neighborhood residents is tied to community-serving institutions' (i.e., police departments, schools, churches) ability to promote positive community functioning (Leventhal & Brooks-Gunn, 2000; Leventhal, Dupéré, & Brooks-Gunn, 2008). When applying this idea to peer culture, one would hypothesize that a cohesive, supportive peer culture is related to a school's ability to promote positive academic achievement.

The idea of collective efficacy and its implications for altering individual outcomes aligns nicely with the hypothesized interactions between the relational and behavioral components of peer culture (recall the four senarios described in Table 1). Collective efficacy proposes that a community's ability to uphold and establish norms is only as strong as the relationships among the individuals who make up the community. In relation to peer culture, this idea suggests that when the relational component of peer culture suggests that students view their

relationships as generally positive, the behavioral messages that the student body sends in regard to achievement will be stronger than in a peer culture marked by negative, unsupportive student interactions.

There is some research available that documents a link between neighborhood collective efficacy and student achievement. Emory, et al. (2009) found that among third-grade students living in low-income areas, passing scores on standardized tests of reading were associated with neighborhood collective efficacy. In addition, neighborhoods that had high collective efficacy and low levels of fear of retaliation and victimization had a larger portion of students passing standardized math tests. Goodard (2001) considered the role of school-level collective efficacy in student achievement. Findings suggested that school-level collective efficacy predicted both reading and math achievement among urban fourth grade students.

Social Network Theory

Social network models demonstrating the dispersion of behaviors among individuals can provide a glimpse at potential mechanisms through which a school's peer culture is initially developed. Under the umbrella of social network theory, there are several explanations offered for why behaviors and characteristics seem to disseminate among groups of individuals. Similar to the idea behind Ryan's process of selection one explaination, known as the homophily hypothesis (e.g., McPherson, Smith-Lovin & Cook, 2001), is that

individuals with similar characteristics simply tend to gather together. Another possibility is that similarities arise due to individuals' shared environments. A third commonly sited hypothesis, and perhaps the most interesting, is the idea of induction (Hatfield, Cacioppo, & Rapson, 1994). Induction proposes that individuals who spend time together tend to take on each other's mannerisms, characteristics, and means of thinking.

Under the peer culture model, it is hypothesized that behaviors can spread among a student body. As such, the social network process that is particularly relevant to the study of peer culture is the idea of induction. The process of induction, however, is not well-understood. It is possible to see behaviors spread throughout a body of people, but it is more difficult to pinpoint what is driving this dispersion of behaviors. Perhaps there are influential teachers or administrators who are able to encourage positive academic behaviors among small groups of students who, in turn, relay this message to other students. Perhaps there is a particular student or a group of students that are highly salient members of a student body (e.g., key opinion leaders; Kelly et al., 2001; Serovich, Craft, McDowell, Grafsky, & Andrist, 2001). These students' academic behaviors may influence the behaviors of their immediate friends, who, in turn, influence the behaviors of second and third degree friends until ultimately a collective academic behavioral style is developed.

The process of induction is not well-documented among student bodies. Nevertheless, social network research more generally has supported several other key elements in the conceptualization of peer culture. Recall the earlier discussion of the Cappicio, Christakas, and Fowler (2009) study of the spread of loneliness through a social network. If one can equate the spread of loneliness to the spread of academic behaviors, a clear demonstration of some basic components that may underlie peer culture can be seen. The model of peer culture hypothesizes that, within a school, academic behaviors can spread throughout a student body (much as loneliness was found to be a function of individuals as well as a characteristic of groups). The peer culture model further theorizes that the behaviors of a given student can play a role in another student's academic behaviors even if those two students do not have any direct interactions. This point is supported by the finding that loneliness was spread among individuals who were separated by up to three degrees of separation. Finally, the finding indicating that individuals who were surrounded by lonely people tended to grow more lonely over time supports the idea that the spread of academic behaviors is cyclical and self-reinforcing. That is, a student may demonstrate a specific academic behavior that may be adopted by the larger student body. Next, as the larger student body comes to demonstrate these behaviors, the behaviors of the individual are reinforced and may grow more pronounced.

Social Norm Theory

According to social norms theory, an individual's behavior is influenced by his/her perceptions of the behaviors of other individuals within his/her group. That is, an individual is more likely to engage in behaviors that he believes other members of his/her group engage in (e.g., Cialdina & Trost, 1998). As such, individuals are constantly monitoring the behaviors and attitudes of their fellow group members to gauge which behaviors are "acceptable" and which behaviors will allow an individual to maintain his/her membership in a particular group. Considering social norm theory in relation to peer culture, if an adolescent perceives that his/her fellow students are academically engaged and treat each other with kindness and respect, the individual adolescent is more likely to engage in such behaviors.

Intervention programs that are aimed at altering social norms in an attempt to alter individual behaviors have demonstrated the strength of social norms in predicting individual behavior and provided innovative techniques for improving adolescent health and behavioral outcomes. One common technique that is implemented is to survey social norms within a group (e.g., a school) and then provide feedback regarding the actual behaviors of group members. For example, college students tend to overestimate the frequency and quantity of alcohol consumption among their peers (e.g. Borsari & Carey, 2003). However, when college students are provided with feedback that describes the actual rates of alcohol consumption of their peers, changes in individual patterns of alcohol

consumption can be observed (Chudley, Pappas, Carlson, DiClemente, Chally, & Sinder, 2000).

Interestingly, recent research and theory suggests that what is most important for predicting individual behavior is individuals' *perceptions* of which behaviors group members endorse rather than their *actual* behaviors. According to Lapinski and Rimal (2005) injunctive norms refer to perceptions of the behaviors that group members approve of while descriptive norms describe actual behaviors of group members. Lapinski and Rimal (2005) theorize that injunctive norms are the norms that individuals are expected to adhere to while descriptive norms simply reflect the aggregate observed behaviors of a group. Hamm et al. (2009) found initial support for Lapinski and Rimal's theory among an ethnically diverse sample of rural adolescents noting that students' perceptions of peer group academic effort and achievement significantly predicted individual academic adjustment in sixth grade above and beyond the effects of peer group descriptive norms.

Social norms theory provides a perspective for understanding the mechanisms through which the behaviors and attitudes of a school's peer culture may be related to individual academic functioning. According to social norms theory, if adolescents believe that their fellow students endorse academic achievement and school engagement, they may alter their behaviors to mirror those of the larger peer group. What is interesting about the social norms

perspective is that there may be a significant gap between *perceptions* of students'

behaviors and students' *actual* behaviors. As such, student achievement, as a

whole, may be high, but if adolescents perceive that their peers are not doing well

in school, their own behaviors may soon follow suit.

Social Control Theory

According to Hirschi's 1969 theory of social control, social bonds within

communities discourage community members from engaging in delinquent

behaviors. Four social bonds – attachment, commitment, involvement, and belief

– are thought to create ties between individuals and communities that encourage

members to align their behaviors and attitudes with those of the greater

community. Hirschi (1969) hypothesized that when these social bonds are weak,

individuals are more likely to purposefully disengage from the community and

participate in behaviors that go against community norms. Of particular relevance

to the study of peer culture is Hirschi's conceptualization of the social bond,

attachment, which relates to the amount of respect and affection that an individual

holds for his/her fellow community members. Connecting this idea to the concept

of relational peer culture, one could hypothesize that, if students feel more

attached to fellow students, then they may be more likely to subscribe to the

academic behaviors and attitudes that their school community advocates.

Recent research examining the links among social control theory and

adolescent behaviors suggests that presence of positive social relationships can

have an additive effect on youth outcomes. According to Yu and Gamble (2010), youth who have a greater number of strong, supportive attachment figures are more involved in school and less likely to engage in delinquent behaviors. Similarly, research examining student-teacher relationships has found that youth who view their teachers as supportive and respectful of students tend to have more positive opinions of school climate and report lower levels of delinquency (LaRusso, Romer, & Selman, 2007).

While there is not research available that specifically examines the links between youth's perceptions of relationships with their fellow students and academic outcomes, much of the extant research examining the tenants of social control theory support the idea that individuals who feel strong bonds to their community and members of their community may be more less likely to engage in behaviors that go against the values of that community. As such, in schools where students perceive their relationships with fellow students to be positive and supportive, youth may be more likely to subscribe to the goals, behaviors, and academic attitudes that the school wishes to promote.

Interactions between Peer Culture and Student Characteristics

In addition to acting directly on student outcomes, peer culture may also interact with individual student characteristics (e.g., family characteristics, peer influences, or teachers) to produce unique outcomes. For example, let us consider how the relational component of positive peer culture may act as a moderator. In

this case, favorable perceptions of peer relationships within a school may help to diminish negative and promote positive influences. Alternately, students' poor perceptions of peer culture may serve to aggravate negative and weaken positive influences on academic outcomes. Imagine an adolescent who has a difficult relationship with her parents (a scenario that has been consistently linked with poor academic outcomes; e.g., Murray, 2009). If this student attends a school where she feels supported by her peers and these peers are simultaneously sending positive messages regarding academic attainment, it is possible that this peer culture may mitigate some of the negative influences the teen experiences at home (e.g., Urberg, Goldstein, & Toro, 2005).

In support of this idea, Beaver, Wright, and Maume (2008) looked at the role of student misbehavior at the classroom level in predicting individual self-control among kindergarten and first grade students. Students who were in classrooms defined by high levels of student misbehavior were more likely to have low self-control. This work additionally suggested that classroom misbehavior moderated the role of parenting in the development of self-control. That is, the higher-order effect of students' misbehavior (aggregated at the classroom level) accounted for individual self-control above and beyond the role of several parenting measures that had been connected with self-control in prior research. While the authors of this study looked at the effect of behaviors at the classroom level (rather than school-wide), these results suggest that a supportive

peer culture may be indirectly related to through its ability to minimize the role of factors (such as a poor parenting) that are negatively related to academic success.

Some research suggests that peer culture may act indirectly on achievement by first enhancing students' feelings of school belonging. The importance of belonging has been well-documented as a precursor to healthy development (Furrer & Skinner, 2003; Ostermann, 2000). Among a sample of urban junior high students, Goodenow and Grady (1993) found that school belonging predicted the value students placed on schoolwork, motivation, and academic effort. Feelings of school belonging, in turn, seem to be at least partly due to students' perceptions of positive relationships with peers. For example, in a sample of sixth-grade students, Hamm and Faircloth (2005) observed that supportive peer relationships were a key predictor in feelings of classroom belonging.

There is also evidence to suggest that a school's peer culture may moderate the role of influences from an individual's immediate peer group (i.e., nominated peers). Mayberry, Espelage, and Koenig (2009) considered how students' beliefs that their school is a positive community environment (defined as students' perceptions that adults demonstrate care and involvement) can moderate the relationship between peer influences and adolescent substance use. Results suggested that a positive sense of community can moderate the effects of peer influences on substance use. In other words, in schools where students do

not feel a strong sense of community, peers may have a stronger influence on substance use than in schools where students do have strong sense of community.

In an examination of broken windows theory in schools, Plank et al. (2009) examined the links among school physical disorder, structural characteristics, fear, collective efficacy (as defined by the combination of individuals' attachment to school and shared expectations for social control) and social disorder in schools. Results indicated that there was a significant relationship between physical disorder (e.g., broken windows, school cleanliness, vandalism, etc.) and social disorder (e.g., fighting among students, students carrying weapons, student drug/alcohol abuse). However, this relationship appeared to be indirect in that physical disorder was related to changes in students' feelings of fear and their perceptions of school levels of collective efficacy, which, in turn, were related to social disorder. Relating this work back to the current discussion of peer culture, it could be that the relational component of peer culture acts first on student characteristics such as emotional functioning and feelings of school connection, which are subsequently related to academic success.

In sum, these findings suggest that the strength of a school's peer culture may not necessarily lie in its direct relationship with student outcomes. Rather, it may be that the most important role of peer culture can be found in its ability to moderate or even mediate the role of other environmental factors that are related

to student achievement and engagement. There are several possibilities for how these processes of moderation and mediation may play out. If a peer culture encourages positive influences or discourages negative influences, peer culture would have a positive relationship with student outcomes. On the other hand, if peer culture detracts from positive influences or promotes negative influences, peer culture would have a negative relationship with student outcomes.

Developing a Testable Model of Peer Culture

Now that the concept of peer culture has been described and potential mechanisms of action explored, it is necessary to develop a model for testing this idea empirically. This empirical model, which represents the first effort to quantify and study the concept of peer culture, will attempt to: 1. determine whether the existence of peer culture can be empirically validated and 2. examine whether peer culture can be linked to individual outcomes. To accomplish this goal, it is necessary to frame the concept of peer culture within our current understanding of other processes that are related to academic outcomes in schools. For example, a model of peer culture that fails to consider the role of individual characteristics such as sex, race/ethnicity, and socioeconomic status, would not be adequate to describe the role between peer culture and student outcomes. As such, in this section, I will review literature from a variety of areas (e.g. peer relationships, school contexts) that will guide the development of an empirical model for testing the potential of the proposed relationship between peer culture

and academic outcomes in the hopes of producing an empirical model that accounts for individual, peer, and school processes that are related to student outcomes that may provide alternative explanations for any observed links between peer culture and academic achievement and engagement.

Although there is an abundance of research describing contexts, individual characteristics, and relationships that are relevant to our understanding of peer culture, there is simultaneously a lack of understanding of how higher-order perceptions of peer relations and peer behaviors may be related to individual functioning. However, prior research has brought to our attention the fact that the contexts in which peer culture occurs and the contexts and individuals with which peer culture interacts will have a significant bearing on how peer culture is related to individual outcomes. As such, research and theory regarding the relations among school, peer, and individual characteristics and academic attainment needs to be acknowledged in the development of the current model. A comprehensive model will acknowledge the various school, peer, and individual effects that occur simultaneously with peer culture. Failing to control for these concurrent influences would be misleading and inaccurate.

The Role of Selection and Socialization

Ryan's theory (2000) of selection and socialization will form the basis of the current model of peer culture. Given that this model represents the first attempt to document the connection between peer culture and individual

outcomes, selection and socialization theory provides a straight-forward frame for conceptualizing and discussing this relationship. While the process of selection is not of central focus here, it is impossible to discuss socialization without acknowledging the idea of selection. Selection suggests that individuals tend to affiliate with individuals and groups with whom they share similar characteristics. As such, before one can begin to quantify the effects of a groups' behavior on individual behavior, the pre-existing similarities of individuals within the same group must be accounted for (Manski, 1993).

Selection and socialization are essential processes through which peer influence is transmitted, but it is also necessary to recognize that these processes do not occur in isolation. Selection and socialization will interact with individual characteristics, and with the contexts (e.g., peer groups, schools) in which they are occurring. First, consider the case of selection. According to Ryan's (2000) theory, through the process of selection, families and students may be drawn to schools and school districts that contain families with similar backgrounds, beliefs, goals, and interests. However, the process of selection should be considered as a bi-directional relationship. On one hand, the family is seeking a certain context that it finds desirable. On the other hand, the contexts that the family had previously selected (e.g., friends, communities) are contributing to their perception of what is "desirable." The school that the family seeks out and its perceived desirability will be guided by the values, expectations, and

characteristics of the family's friends, relatives, and community. Families that live in low-income communities, where unemployment rates are high, may devalue education because the community lacks role models that demonstrate how education can translate into career success (Duncan, 1994). Therefore, the schools within such a community may be more likely to contain students that come from families that do not emphasize education.

Characteristics of the individual, family, school, and community will impact the process of socialization in a similar, bi-directional relationship. The role of the individual in this process may be the most obvious. Once the student (or the student's family) has selected a school, the messages that a school's peer culture transmits regarding the importance of academic attainment will filter through characteristics of the individual. What are the individual's family values in regard to academic achievement? How much importance does the individual place on fitting in with his/her peers? How was the individual doing academically before he/she came in contact with this peer culture? These pre-existing values and behaviors will determine how the individual responds (if at all) to peer messages regarding academic outcomes. The larger school and community contexts also will play important roles in guiding the outcome of socialization. For example, the school can act by creating an environment that promotes academic collaboration among students. In such an environment, students may be more likely to look to their peers for guidance and assistance in the academic

realm than is the case with students attending schools that place less emphasis on scholastic cooperation.

Ryan's (2000) theory about the processes of selection and socialization is fundamental to conceptualizing the pathways through which peer culture may exert influence. However, the literature reviewed in the subsequent sections of this paper suggests that additional consideration of the contexts in which peer influence occurs is needed. The processes of selection and socialization can be seen as the necessary mechanisms through which peer influence is exerted. However, they may not be sufficient. The individual, peer, school, and community contexts in which selection and socialization are occurring, can be viewed as factors that will interact with two processes to produce unique outcomes. What is needed, then, is a theory that can combine the process components with the contextual components of this system.

Before I discuss peer culture and the role of context in the process of selection and socialization can begin, it is important to acknowledge that peer culture itself can be considered a context. That is, peer culture can be considered a component of the school system that will impact the day-to-day lives of students and faculty alike. Typically, research regarding peer influence examines transmission of behaviors, values, or beliefs from one individual to another. In some cases, researchers also have examined transmission of influence from a peer group (a context) to an individual. Here, I will examine how peer culture (a

context) can influence other contexts (e.g, peer groups) and individuals. As such, I will be examining how mechanisms of selection and socialization are at work in interactions among contexts, and between contexts and individuals. Overlaying this idea, I will consider how the communities and schools in which peer culture, peer groups, and individuals are embedded may be related to the processes of peer culture selection and socialization.

Selection, Socialization, and Contexts

Several theories can be drawn on to understand the way that context may play a role in how a school's peer culture exerts influence. The primary theory I will rely on to describe these relationships is developmental systems theory ([DST], e.g., Bronfenbrenner & Morris, 2006; Gottlieb, 1992; Lerner, 2002, 2006; Overton, 2010; Thelen & Smith, 2006). DST emphasizes the importance of understanding the role of context and bidirectional lines of influence among contexts and individuals in the study of human development. DST can be viewed as a broader theory of human development that can be used to understand a range of contexts, influences, relationships, and interactions over the lifespan. In addition to drawing on DST, I will also rely on work from several researchers (e.g., Crosnoe, Hinde, and Rubin) who have developed theories that specifically address our understanding of peer influences. In this section, I will begin with descriptions of theories that address peer relationships specifically and then demonstrate how elements from these theories can be combined with a DST

perspective to guide our understanding of a peer culture's ability to transmit influence.

Hinde (1995) proposed a theoretical structure to aid understanding and research regarding human relationships. According to Hinde, it is necessary to consider dynamic interactions (Lerner 1978a, 1978b) between and among individuals within relationships as well as outside forces acting on these relationships. Included in this model is understanding the sociocultural context within which the relationships occur. Rubin, et al. (2008) elaborated on Hinde's model for conceptualizing human relationships and applied it towards understanding childhood and adolescent peer relations. The authors described four hierarchal levels for understanding peer variables: interactions, relationships, groups, and culture. Interactions, defined as dyadic exchanges, are shaped by reciprocal influences among the individuals' behaviors during the interaction. A series of interactions between two individuals begins to form and define a relationship, which becomes a context directing the nature of interactions. At the next level, is the group, which has unique characteristics and a system of norms based on the interactions and relationships that it encompasses. At the highest level, is culture, which contributes both physical and social directions and limitations to individual and group behavior.

Crosnoe (2000) proposed the use of life course theory (Elder, 1998), which integrates individual, family, cultural, social, and historical perspectives to

understand development from infancy to adulthood, to combine findings

regarding adolescent peer relationships in the fields of psychology and sociology.

Similar to Hinde (1995) and Rubin, et al. (2008), Crosnoe's proposed theoretical

orientation emphasizes the importance of the social context for understanding

relationships. Crosnoe further advocates for enhancing understanding of

development by considering the interactions among individual characteristics and

social contexts.

Hinde, Rubin, and Crosnoe provide ideas to aid the understanding of child

and adolescent peer relationships. Their concepts mirror many of the concepts

put forth in developmental systems theories ([DST], e.g., Bronfenbrenner &

Morris, 2006; Gottlieb, 1992; Lerner, 2002, 2006), which provide a framework

for understanding human development more broadly. Like Hinde, Rubin, and

Crosone, proponents of DST propose that individuals are embedded in a nested

and mutually interrelated set of ecologies or contexts (e.g., family, peer, school,

community). Developmental Systems Theory use a holistic model to describe

development, emphasizing the idea that the individual can not be studied in

isolation (i.e., in the absence of understanding of the contexts in which he/she is

embedded).

Let us first consider how the bidirectional interactions among the

individual and his/her context may affect the socialization of academic

achievement within a peer culture. All individuals will enter a school's peer

culture with pre-existing academic behaviors and attitudes. When given an opportunity, individuals will gravitate towards contexts that are accepting of their pre-existing preferences and characteristics (Cohen, 1977; Kandel, 1978). At times, the academic characteristics that the individual brings to their contexts will be embraced, and therefore reinforced. At other times these characteristics may be rejected, potentially prompting individuals to alter their behaviors and attitudes. Individual characteristics that the peer culture accepts may be incorporated into the context. That is, individuals' academic behaviors and attitudes may influence and be incorporated into the peer culture's academic orientation. The peer culture's attitudes, in turn, may influence the individual's attitudes in a continuous, cyclical process.

In sum, DST acknowledges the significance of context and the embeddedness of contexts, similar to Hinde, Rubin and Crosnoe (e.g., Bronfenbrenner, & Morris, 2006; Thalen & Smith, 2006). Of particular importance to the study of peer culture is the DST idea that interactions are not only occurring between the individual and his/her contexts, interactions also occur among the contexts themselves (Lerner, 2006). These interactions will occur in a manner similar to that which was described for the individual. Characteristics of each context will be imparted onto other contexts. Depending on the values, ideals, and characteristics of the context into which these characteristics are being imparted, they may be promoted, or they may be diminished. Furthermore,

unique characteristics of each context, which are not derived from inputs from other contexts, will promote maintenance and change in other contexts (Lerner, 2002).

Following the principles outlined by the theorists noted above, the processes of a peer culture's socialization of academic behaviors within schools can be altered by the individual's bidirectional interactions with his/her context as well as by bidirectional interactions among the contexts themselves. Research has identified individual characteristics as well as peer and school contextual factors that are relevant to understanding peer influences on academic outcomes within schools. In the following section, I use this extant research to demonstrate how individual, peers, schools and communities guide selection and socialization of peer influences and moderate their eventual relationship with individual academic outcomes. Figure 2 provides a representation of the proposed model.

Insert Figure 2 about here

Understanding the Roles of Individuals, Peers, and Schools in Peer Culture

Socialization Processes

As presented in Figure 2, the current conceptual framework proposes that Ryan's (2000) theory of selection and socialization should be integrated with work from theorists such as Hinde (1995), Rubin et al. (2008), Crosnoe (2000),

and developmental systems theorists (e.g., Bronfenbrenner & Morris, 2006;

Gottlieb, 1992; Lerner, 2002, 2006; Overton, 2010, Thalen & Smith, 2006).

Within this framework, the processes of selection and socialization are guided

both by individual characteristics and by interactions among the individual and

the peer, and school contexts. The contexts in which peer selection and

socialization are occurring can be seen as filters through which these processes

must pass before the ultimate strength and direction of their influence are

determined.

Before this framework is further elaborated and reviewed in light of

current empirical findings, there are few organizational characteristics of this

review that should be understood. First, in relation to a school's peer culture, the

process of selection is less of an active process for students than that of

socialization. As discussed earlier, adolescents do not typically choose the school

they attend (and therefore the peer culture they are a part of). Rather, the process

of selection tends to lie more in the hands of students' families (i.e., the social,

cultural, and economic forces that drew the family to select a certain school or

community). As such, selection will be addressed, however the majority of the

discussion will center around peer culture and processes of socialization.

Second, in the following discussion, individual, peer, and school

characteristics are examined in separate sections. Although separation is useful

for organizational and analytical purposes, in reality, a line of separation among

these contexts does not exist. Indeed, there are myriad instances in the following sections where one could easily interject demonstrations of how these contexts are interacting. In addition, much of the empirical research used to support the importance of each context in fact supports the idea that these contexts are constantly interacting. As such, in several instances the same research is used to describe the relevance of several contexts, however, different aspects of the research are highlighted.

Finally, it is important to acknowledge that the developmental system that I am examining does not stop at the level of the school. Rather, the school itself is also embedded in a larger community that plays a role in a school's learning and teaching philosophy, treatment of students, and financial funding. However, here, I am limiting the scope of this dissertation to the school level both for the sake of parsimony and because of the fact that adding an additional level of analysis to the current model would generate methodological complexities that would limit our ability to examine the basic questions at hand regarding the relationship between peer culture and academic achievement and engagement.

The Individual

The strength of a peer culture's messages will depend largely on characteristics of the individual. Individual variables such as sex, race/ethnicity, and emotional, behavioral, and academic characteristics interact with processes of socialization by guiding reactions to peer influences, interpreting social

information (Crick & Dodge, 1994; Lemerise & Arsenio, 2000), and determining the magnitude of peer influences. For example, individuals who place a strong emphasis on the importance of peer acceptance are likely to be more susceptible to socialization of peer messages than individuals who are less concerned with gaining peer acceptance (Fuligni, Eccles, Barber, & Clements, 2001).

The individual can be viewed as a filter through which a peer culture's messages must pass. Certain characteristics may lead him/her to be more susceptible to peer influence while other characteristics may cause him to be less vulnerable. There is a reasonable amount of research from the peer relationship literature outlining some of the characteristics that lead individuals to be more or less receptive peer influence. We can draw on this literature, hypothesizing that these individual characteristics may play a similar role in determining the strength of the relationship between peer culture and individual functioning.

Research suggests that demographic characteristics such as sex and racial and ethnic background play an important role in marking processes that interact with peer socialization. Differences in responses to peer socialization between males and females and among individuals from different ethnic groups are also well documented (Faircloth & Hamm, 2005; Frank et al., 2009; Riegle-Crumb et al., 2006). Of course, when considering the role of such characteristics in process of selection and socialization, it is not simply being male or female or of a certain racial or ethnic background that determines these differences. Rather, these

demographic characteristics serve as markers of underlying processes that are contributing to different responses to peer influences.

In the case of sex, there is some evidence to suggest that females may be more likely to respond to peer messages regarding academic behaviors than males. Riegle-Crumb, et al. (2006) found that, among females, having friends who demonstrate high math and science achievement increases the likelihood that students will subsequently enroll in advanced math and science coursework. Among males, however, friends' grades played no role in course selection. For females, seeing their peers succeed in the traditionally male-dominated fields of math and science can increase the likelihood that they too will attempt to succeed in these fields. Among males, for whom a plethora of renown male role models in the fields of math and science are readily available, the role of peer success may be less important for encouraging pursuit of these fields.

Sociologists and social policy researchers provide evidence suggesting that individual racial and ethnic background may mark processes that interact with peer influences on academic outcomes. Cook et al. (2007) followed a group of students from seventh through tenth grade and examined racial differences in responses to peer influence. African American students were more responsive to friends' influence than European American students. This finding aligns with research suggesting that African American male adolescents tend to have more intimate friendships than their European American counterparts (DuBois &

Hirsch, 1990). Perhaps African American students, who may enjoy closer

relationships with their peers, attribute greater importance to peer relationships

than white students and therefore peers yield a stronger influence.

In addition to demographic characteristics, complex emotional, academic,

and behavioral characteristics are likely to play a role in the socialization of

academic attitudes and behaviors. Consider the role of individual emotional

functioning. Research suggests that negative emotionality may promote negative

peer interactions, which subsequently detract from academic achievement

(Brendgen, Lamarche, Wanner & Vitaro, 2010). For example, individual

emotional distress is linked with movement towards affiliations with negative

peer groups, which, in turn, predicts problematic school behaviors such as

cheating on tests and skipping school (Roeser, Eccles, & Sameroff, 2000).

Alternatively, positive emotional functioning may promote positive relations with

peers, which will likely further positive emotionality and create a situation in

which the individual is less likely to be distracted from school due to emotional

difficulties.

Individual behavioral characteristics, such as aggression, prosocial

behavior, and engagement in delinquency, may also be related to the strength of

the influence of peer culture on academic behaviors (Eisenberg, 2008). Wetzel

and Caldwell (1997) examined the role of prosocial behavior, defined as behavior

that is intentionally committed to benefit others, in the relationship between peers

and academic outcomes. The authors observed peer group membership (determined through friendship nominations) and academic achievement among sixth grade students. Analyses suggested sixth grade peer group membership was the strongest predictor of academic achievement two years later, when students were in the eighth grade. However, when eighth grade prosocial behavior was entered into the equation, it became the strongest predictor of academic achievement, suggesting that among prosocially-oriented individuals, peer culture may be less related to academic achievement.

A student's initial level of academic, achievement, engagement, and motivation also can interact with peer influence to generate unique outcomes. For students who already place a high importance on school-related behaviors, the academically-oriented messages that the peer culture sends may be more salient, and therefore have a greater impact. Kindermann (2007) used sociocognitive mapping (SCM), which relies on student reports to identify social network clusters, to identify peer groups of sixth grade students within a school. He examined how peer group school engagement profiles (defined as the average level of school engagement of all group members) in the fall of sixth grade influenced individual school engagement in the spring of sixth grade. Results suggested that the peer groups' school engagement profile significantly altered individual engagement from the fall to the spring. However, for students who were already high on school engagement in the fall (defined as greater than one

standard deviation above the school-wide median), the peer engagement profile had a stronger relationship with spring school engagement than was the case for students whose school engagement scores in the fall fell below the school-wide median.

Findings such as these suggest that a student's pre-existing academic characteristics (e.g., engagement, achievement, and motivation) may be related to the strength of peer socialization of academic attributes. In the Kindermann (2007) study, students who were more academically engaged were most susceptible to peer socialization processes. It may be that, among these students, academic success is a more salient goal and they are more likely to utilize resources (e.g., peer role models) available in their environment that could help them attain this goal. Ryan's (2001) theory of selection suggests that more engaged students are likely to join peer groups where academic success is encouraged and rewarded. As such, an individual's pre-existing academic behaviors are likely to be an initial guide to the student in the peer group selection process and, subsequently, direct the degree to which the individual attends to the academic information that the peer group provides.

While individual characteristics, such as school engagement and achievement, may lead some students to be more likely to attend to school-related messages from peers, other students still may demonstrate a more general inclination to be influenced by peers that leads them to be more likely to alter

academic behaviors in response to peer influences. An individual's peer orientation, that is, the emphasis he or she places on peers, his or her susceptibility to peer influence and likelihood to seek peer advice may moderate the role of peers in altering academic behaviors. Fuligni et al. (2001) found that students who had an extreme peer orientation in junior high school had lower academic achievement in their high school years. The authors hypothesized that peer orientation works during both the processes of selection and socialization. It is correlated with a greater likelihood of associating with deviant peers (selection), and it is further associated with a greater willingness to sacrifice schoolwork at the behest of peers (socialization).

The Peer Group Context

Before we discuss the interactions that may be observed between the peer group context and the peer culture, it is helpful to reexamine the distinction between these two concepts. The peer group context refers to the smaller, intimate friendship groups (sometimes called "cliques") found within schools. Empirically, these groups are typically identified through peer nomination processes in which individuals are asked to report their closest friends. Researchers often submit these results to analyses using a variety of software packages (e.g. KliqFinder) that are able to identify clusters of students with mutually-nominated friendship ties. The results of such analyses then allow researchers to create aggregate profiles of peer group behaviors based on survey

data from individuals within the peer group (e.g., Frank et al., 2008; Kindermann, 2007; Riegle-Crumb et al. 2006).

Processes of socialization from the peer group and the peer culture will overlap and show considerable interaction. These two peer contexts likely share complex ties of influence that at times serve to enhance socialization of one another's messages and at other times contradict and diminish one another's messages. Let us first consider the behavioral messages that the peer culture and the peer group demonstrate. An important factor in determining how the peer culture's and peer group's behavioral messages will interact is whether or not the messages are contradictory. When a peer group's behaviors are constant with those of the peer culture, the effects of the peer culture may be reinforced. When a peer group's behaviors are in opposition to those of the peer culture, the peer culture's effect may be reduced. Let us consider this proposed interaction between the behavioral messages of the peer culture and the behavioral messages of the peer group to represent the core process underlying this relationship. While this first interaction may appear straightforward, when we take into account the relational component of peer culture as well as relational characteristics of the peer group, this dynamic quickly becomes more complex.

Earlier, in the description of Table 1, I discussed how the relational component of the peer culture will work to determine the strength of the behavioral messages that the peer culture is attempting to socialize. It was

proposed that a positive perception of peer relations will help to strengthen the impact of behavioral messages (Ogbu, 2003; Urberg et al., 2005). In a similar manner, it is likely that within peer groups the quality of friendships will play a role in the peer group's ability to socialize behavioral messages. If individuals within a peer group enjoy close, supportive relationships, perhaps a peer culture that is perceived to be generally negative will play less of a role in individual functioning. It is possible that within friendships that are of higher quality, individuals will be more likely to attend to peer group messages regarding academic achievement than to messages from the peer culture. Support for this idea comes from research examining adolescent risk behavior where findings suggest that the quality of peer relationships can moderate the strength of peer influences (e.g., Poulin, Dishion, & Haas, 1999). For example, Urberg, et al. (2005) found that friendships that are perceived to be of high quality (e.g., supportive, reciprocal) were related to increases in individual drinking behaviors whereas there was no relationship between low-quality friendships and alcohol use.

The social desirability of peer group membership may also determine how peer culture and the peer group interact. If membership in a certain peer group is highly desirable, an individual may be more likely to subscribe to the groups' values and expectations in an effort to sustain membership. In such a scenario, the messages of the peer culture may be less influential. On the other hand, if a

peer group is less socially desirable, an individual may be more likely to subscribe to the attitudes and behaviors that the peer culture puts forth in an attempt to improve his/her social status with the general student body.

In one of the few studies that has considered the interaction between school-wide academic characteristics and peer group influences, Crosnoe, et al. (2003) used data from the National Longitudinal Study of Adolescent Health (Add Health) to examine the relationships among supportive friendships, academic functioning, and school-level achievement. Results indicated that having academically-oriented friends decreases the likelihood of adolescents engaging in "off track" academic behavior (e.g., repeating a grade, difficulty finishing homework), regardless of a school's overall achievement level. However, in low performing schools, this relationship was significantly stronger (Crosnoe, Cavanagh, & Elder, 2003). That is, academically-oriented peers may play a stronger role in protecting against academic failure in schools of greater disadvantage.

The School Context

The school context will play an essential role in the formation of a peer culture's attitudes and behaviors. There are two important components of the school that should be discussed here. First, there is simply the structure of the school. What are the characteristics of its student body? How does the school organize courses? What extracurricular activities are offered? Second, there are

the faculty and staff within each school who will contribute their goals, behaviors, and attitudes to the development of peer culture. What are student-teacher relationships like? Are teachers effective? Do teachers feel supported? Both the structure of schools and characteristics of staff will contribute to the development of peer culture by organizing student interactions and providing models for academic behavior. These entities will also interact with peer culture, at times enhancing and at other time detracting from its relationship with individual students.

Part of the function that schools serve in the development of peer culture is the somewhat passive role of acting as an organizing body that draws a certain group of students together. As such, part of a school's function in the development of peer culture is to simply organize a student body's process of selection. The geographic, socioeconomic, religious, political, and educational characteristics of each school draw certain students that are likely to share several common characteristics. These characteristics, in turn, will play a role in the attributes that a school's peer culture comes to embody. For example, in a school in an affluent community, students are likely to come from high SES families. Prior research suggests that high SES students are more likely to be high achieving. In such a school, the peer culture may be more likely to display behaviors that endorse achievement. On the other hand, consider a school located in a community with high levels of violence. Students in such a community may

be accustomed to violence and may be more likely to endorse violent behavior. In this school, a peer culture may be marked by poor student relations and student hostility (Ozer, 2006; Ripiski & Gregory, 2009).

School characteristics such as school size, socioeconomic status (SES), racial composition, academic expectations, and standards and norms are related to the messages that peers socialize regarding academic attainment as well as the likelihood that individual students will attend to peer messages (Lee, 2001). There is an extensive body of research linking structural characteristics of schools with student performance. For example, Lee and Burkam (2003) found that above and beyond individual characteristics of students, school size and the structure of course offerings (i.e., percent of academic versus non-academic courses offered) was significantly related to student drop-out. In addition, reports of positive relationships with teachers was negatively associated with drop-out.

It is also likely that characteristics of a school may help to determine the strength of peer influences. For example, in a school with high expectations and adequate resources to promote student achievement, individual achievement may be less likely to be influenced by peers' models of achievement (e.g., Crosnoe, Cavanaugh, & Elder, 2003). Such a school context may reduce the strength of peers by providing expectations and resources that "outweigh" peer influences. This school also acts to reduce negative peer influences simply by decreasing the presence of low-achieving peers.

In addition to drawing a specific student body, schools also organize their student body such that some students are more likely to intermingle than other students. A school can impact the process of friendship selection by placing specific students together in classrooms (e.g., tracking) or activity groups. Given that proximity is one of the strongest predictors of friendship (Hallinan & Williams, 1989), schools can dramatically alter the likelihood that adolescents will experience specific peer influences simply by placing students in the same academic track or extracurricular activity group. In fact, research suggests that classmates may have a stronger influence on adolescent behavior than friends (e.g., Mayberry et al., 2008). For example, Lynch and Leventhal, (2009) compared the influence of friends who are enrolled in the same courses to the influence of friends who are not enrolled in the same courses. Results suggested that GPA of friends who share courses had a significant impact on individual GPA while there was no relationship between individual GPA and GPA of friends that did not share courses.

Teachers and administrators in schools can also guide the development of peer culture through the promotion of positive student-teacher relationships (Furrer & Skinner, 2003). As students' perceptions of having high-quality, supportive relationships with teachers increases, so does school engagement (Skinner, Furrer, Marchand, & Kindermann, 2008). When students feel disconnected from teachers, administrators, and the academic messages the school

promotes, they may be more likely to form friendships with individuals who feel

similarly disconnected from school. Once these peer groups are formed, it is

likely that little emphasis will be placed on academic attainment, and, in fact,

behaviors that demonstrate dissatisfaction with the school environment may be

encouraged. Zimmer-Gembeck et al., (2006) found that individual perceptions of

school fit fully mediate the link between peer relationships and school

engagement. The authors interpreted this finding as evidence that peer

relationships may act on school engagement by improving perceptions of school

fit. An alternative interpretation is that in schools where students feel that they

belong and are valued, the role of peer relationships (and potentially that of peer

culture) is lessened.

Research Questions and Hypotheses

We have discussed the concept of peer culture and developed a model that

can be used to examine how peer culture relates to individual academic outcomes.

This model uses a DST approach, taking into consideration the multitude of

individual, peer, and school characteristics that need to be accounted for in our

efforts to understand the role of peer culture. As is frequently the case when a

new concept is introduced, there are a myriad of research questions that can be

generated. However, here, I will focus on just those questions that seem most

salient in documenting the validity of peer culture as a theoretical construct and

examining whether there is a relationship between peer culture and individual academic outcomes.

Research Question 1: How can peer culture be measured in the 4-H Study and Add Health?

Before the study of peer culture can proceed, valid, reliable measures of peer culture must be identified in the 4-H Study and Add Health. One drawback of using extant data is the fact that newly created measures are limited by the data that is available. Raudenbush and Sampson (1999) argued that when creating measures of ecological settings (such as schools), traditional psychometric approaches to assessing measurement validity and reliability are not sufficient. The authors propose an "ecometric" approach to understanding measures of context, especially measures that result from aggregating individual-level data to create a hierarchal contextual measurement variable. I will use Raudenbush and Sampson's (1999) ecometric method to examine whether measures of peer culture from the 4-H Study and Add Health, which will be created by aggregating student responses within schools, are valid, reliable contextual measures.

Research Question 2: Is peer culture related to individual academic outcomes?

As outlined in the development of the research model that frames our present model of peer culture, the question of whether peer culture is related to individual academic outcomes will require acknowledgement of the multitude of

individual and contextual factors that may simultaneously be contributing to students' academic attainment. The theoretical model outlined in Figure 1 will be used to develop a statistical model that uses the measures developed under Question 1 to examine the links among peer culture and individual GPA and school engagement. Individual GPA was selected as an outcome because it represents a salient and universally understood metric of academic achievement that can help to describe the role of peer culture to both researchers and policymakers. School engagement was selected as the second outcome because it allows me to examine some of the intellectual and behavioral processes that may underlie student achievement.

Research Question 3: How do the relational and behavioral components of peer culture interact?

As outlined in the discussion of Table 1, it is hypothesized that the behavioral and relational components of peer culture will interact to produce unique outcomes. In line with previous findings from Ogbu (2003), it is hypothesized that the relational climate of the school will be related to the strength of the behavioral messages that a peer culture sends in regard to academic achievement and engagement. In schools where the relational component of peer culture is positive, there will be stronger relationship between the behavioral component of peer culture and student's academic outcomes than in schools where the relational component of peer culture is negative. It is

important to highlight that I hypothesize that this relationship will work in a

similar manner regardless of the behavioral message (i.e., whether achievement

and engagement are encouraged or discouraged) that the peer culture sends.

Chapter 3

METHOD

Data from the 4-H Study of Positive Youth Development (4-H Study) and

from the National Longitudinal Study of Adolescent Health (Add Health) were

used to explore the relations among peer culture and individual academic

outcomes. Both data sets allowed for examination of the idea that each school has

its own peer culture, which is related to individual academic outcomes. Most

importantly, these data sets afforded an opportunity to replicate findings across

two adolescent samples. Using the 4-H Study data, I used 5th Grade peer culture

to predict student outcomes in 6th Grade. The Add Health sample was comprised

of students in Grades 7-11 at Wave 1. Peer culture at Wave 1 was used to predict

academic outcomes at Wave 2 (when students were in Grades 8-12). In addition,

the Add Health data allowed the opportunity to consider the role of immediate

friendship groups in the relationship between peer culture and adolescents'

academic achievement and school engagement.

The 4-H Study Sample, Design, and Procedure

Each year, participants in the 4-H Study completed self-report

questionnaires in school or online. For the first three waves of data collection,

teachers or program staff gave each child an envelope to take home to the parent

or guardian. The envelope contained a letter explaining the study, two consent

forms (one that was returned to the school and one that could be kept for the

records of the parent or guardian), a parent questionnaire, and a self-addressed

stamped manila envelope for returning the parent questionnaire and consent form.

Data collection was conducted by trained study staff or assistants hired at more

distant locations. A detailed protocol was used to ensure that data collection was

administered uniformly and to ensure the return of all study materials. The

procedure began with reading the instructions for the student questionnaire to the

youth. Participants were instructed that they could skip any questions they did not

wish to answer. A two-hour block of time was allotted for data collection, which

included one or two short rest periods. During Wave 2, students who were unable

to be surveyed at their school or 4-H site, in that they were either absent during

the day of testing or the school superintendent did not allow testing to occur in the

school, received a survey in the mail.

The 4-H Sample

The current study will use all participants who entered into the 4-H study

at Wave 1. In Wave 1, the 4-H study surveyed all 5th grade students within 30

schools. Following Wave 1, many students changed schools (e.g., they left their

elementary school to enter middle school) or left a school system entirely. As

such, Wave 1 provides the best opportunity in the 4-H Study for large numbers of

student responses to be aggregated within schools. In the first wave of data

collection in 2002, participants were 1,718 5th graders from 30 schools in 13

states. At Wave 1, 45.9% of participants were boys with a mean age of 10.99 (*SD*

=.02) years. Fifty-one percent were European American, 17.8% Hispanic, 7.6% African American, .4% American Indian, 3.8% Asian American, and 2.9% multiethnic. Please see Table 2 for a complete description of the 4-H Study sample.

Attrition in the 4-H Study sample is not randomly distributed across schools. For example, in Wave 2 and Wave 3, some principals withdrew consent for their school to participate, and thus, these students "dropped out" without having had the opportunity to remain in the study. The withdrawal of principal or superintendent permission to continue testing resulted in the loss of 561 participants in Wave 2. However, attrition from Wave 1 to Wave 2 for students who were allowed to be asked to remain in the study was only 10%. Of the 1,954 participants tested in Wave 2, 21.5% individually withdrew their participation from Wave 3, whereas 337 (17.5%) dropped out because of school/site attrition.

Insert Table 2 about here

The Add Health Study Sample, Design, and Procedure

Add Health researchers surveyed a sample of 90,118 7th -12th grade students in 132 schools during the 1994-1995 school year (Wave 1) (Harris, 2008). The schools were randomly selected from a stratified sampling frame based on region, racial composition, size, sector, and urbanicity. From this "in-

school" sample, a subsample of 20,745 students was selected to complete a more in depth interview at home. In-home interview participants were reinterviewed in 1996 (Wave 2, $N = 14,738$). In addition to data from the Add Health Wave 1 and 2 in-home surveys, high school transcript data are available for Add Health in-home interview participants. The Adolescent Health and Academic Achievement study (AHAA), which was launched in 2000, aimed to collect transcript data for all Add Health in-home interview participants. In all, the AHAA study contains valid transcript data for 12,250 Add Health in-home interview participants.

A key component of the Add Health data relative to the current analyses is the ability to examine participants' peer relationship characteristics by incorporating data directly from participants' identified friends. To identify participants' friends, Add Health researchers asked each individual to name his/her ten closest friends. If one or several of these friends also participated in Add Health, analysts are able link the participant's survey with his/her friends' survey data from in-school data collection. When a participant listed several peers, analysts can create aggregate profiles of individual peer groups by averaging constructs of interest across all identified peers. For example, in the present study, to create a profile of students' peer groups' academic behaviors, aggregate scales of GPA were created by averaging the GPA of all identified peers, minus the GPA of the individual who generated the peer nominations.

In all, a variety of sources of data from the Add Health and AHAA studies were used in the current study to construct individual, peer, and school-level variables. Measures from Wave 1 and 2 Add Health in-home interview data and AHAA transcript data were used to develop measures of individual characteristics. Data from student transcripts, the in-home surveys and the in-school survey contributed to the creation of peer group profiles. Data from the entire in-school sample as well as data from the School Administrator questionnaire were used to construct aggregate measures of school-level characteristics.

The Add Health Sample

Given that GPA was one of the primary outcomes of interest, selection criteria for the current sample required that participants had transcript data available. In addition, to correctly account for the stratified sampling design of Add Health, participants were required to have sampling weights. At Wave 1, the resulting sample of 11,636 adolescents were 50.1% female and an average of 15.12 (SD=1.14) years old at Wave 1. Participants represented diverse ethnic and racial backgrounds: 33.8% were of Latino origin, 70.9% European American, 15.5% African American, 4.8% Asian American or Pacific Islander, 4.8% American Indian or Native American, 7.7% multiracial or other racial category. See Table 3 for a complete listing of all Add Health variable descriptive statistics.

Insert Table 3 about here

Data Analysis Plan

The 4-H Study and Add Health were analyzed using two-level hierarchal linear models. In both studies, participant data are clustered or nested. Because students within schools may be more likely to share certain characteristics than students among schools, such nesting violates the traditional regression assumption of independence of observations and contributes to the generation of biased standard errors, which can skew results. Hierarchical Linear Modeling (HLM), however, corrects for the nesting of data and allows individual variables to be observed in relation to individual and school-level effects.

All analyses were conducted using the software programs Stata 11.0 and HLM 6.08. These programs were selected both for their statistical power and for their ability to account for Add Health's stratified sampling design through the use of weights at each level of the analysis. Analyses of the 4-H Study and Add Health both relied on two-level hierarchal models which assessed the interrelation of individual (Level 1) and school characteristics (Level 2). In all models tested, variables entered at the individual level (level 2) were group-mean centered while variables entered at the school level (level 2) were grand-mean centered.

Missing Data

The studies contain participants who have missing data both at the item and scale level. One of the most commonly employed procedures for handling missing data is multiple imputation (Rubin, 1987), which involves two components for estimating missing data. First, analysts create multiple, complete data sets that contain estimates of missing data. Second, results from these data sets are then combined (using Rubin's combination rules) to generate final model estimates. Multiple imputation has several advantages over single imputation. Most importantly, the range of standard errors provided allows users to account for the degree of uncertainty that accompanies estimation of missing data. As such, there is less of a risk that standard errors will be underestimated, and the probability of Type I error is reduced.

I used the software program, SAS 9.0, to generate ten imputed data sets for each study. Rubin (1987) recommends generating between 3-10 data sets. While many users are surprised by the small number of data sets required in multiple imputation, the results of simulation studies suggest that unless the rate of missing data is very high (i.e., greater than 50%), the precision gained in each additional data set beyond the tenth is negligible, especially given the efficacy that is sacrificed as the number of data sets increases.

For both the 4-H Study and Add Health, I generated separate imputation models for individual (Level 1) and school (Level 2) characteristics. After each level was imputed, I combined the individual and school-level imputed data sets

to conduct all analyses. The imputation models included all variables to be used in the final analyses (including the outcome variables, GPA, and school engagement), sampling weights, and a series of additional variables that were not of interest to the current analyses, but may be related to model predictors. All descriptive and multivariate statistics that are reported represent results that have been combined across all ten data sets using Rubin's (1987) combination rules.

Outcomes

In both the 4-H Study and Add Health, I examined the relations among peer culture and two primary outcomes: GPA and school engagement. Grade point average was chosen as an outcome to provide a quantifiable, short-term assessment of the role of peer groups and peer culture in individual academic attainment. Grade point average is a commonly used assessment that is accessible to researchers and practitioners from a variety of disciplines. School engagement has received increased research attention due to recent findings suggesting that, in regard to schooling, many adolescents are more focused on grades than on the actual value of learning. According to some accounts, youth report that they try to put in the least amount of effort necessary to earn respectable grades (e.g., Pope, 2002). The construct of school engagement is thought to reflect a commitment to school that is necessary (beyond simply achieving adequate grades) for long-term academic and career success (Fredricks, Blumenfeld, & Paris, 2004; Li & Lerner, 2011). While GPA provides information about student

achievement, school engagement demonstrates whether students have a dedication to and respect for learning that may in fact be a better predictor of future success than GPA.

In the 4-H Study I examined, in two separate models, the relationship between peer culture and GPA and school engagement from Waves 1-2. Grade point average and school engagement data are available for participants through the end of high school. However, as previously discussed, students in the 4-H study often change schools. As such, examining short-term predictions of academic success (from Grades 5 to 6) rather than long-term predictions (from Grades 5 to 12) may help to avoid issues surrounding the fact that students are potentially being exposed to different peer cultures as they move through different school contexts. Similarly, in the Add Health study, I used Wave 1 measures of peer culture to predict student outcomes at Wave 2. For example, in the model that examined the relations among peer culture and individual GPA, I used Wave 2 GPA as the outcome and Wave 1 peer culture as the primary independent variable of interest in the model.

Replication of Findings in the 4-H and Add Health Studies

A primary goal of using two data sets was to replicate findings across studies, and potentially strengthen the validity of findings. While replication is a goal of the current analyses, differences between the 4-H and Add Health study samples and methodologies may prevent exact replication of findings. In regard

to study samples, at Wave 1, the 4-H Study sample was comprised entirely of 5th Grade students. Wave 1 of the Add Health sample included students in Grades 7 through 11. As such, a failure to replicate findings across these samples may signal the presence of developmental differences in the relationship between peer culture and academic outcomes.

It is also important to consider that because I relied on extant data, the construction of measures is limited by the data available. As a result, variables were measured slightly differently in the 4-H Study and Add Health. While I attempted to duplicate variables across studies, it was impossible to create exact replications of all measures used. Issues regarding the replicability of measures across studies are discussed in greater detail in the Discussion section. A second limitation of using extant data is the fact that I was not able to control whether youth changed school (and therefore peer culture) environments across waves. As such, youth may be in one school, which has a certain peer culture at Wave 1, but by Wave 2, they may have entered a new school system with an entirely different peer culture. While I attempted to reduce the effects of such transitions by using data from short time frames (e.g., from the fall of one school year to the fall of the subsequent school year), it is difficult to determine how students' potential transitions into a new peer culture may have impacted study findings.

Accounting for Selection in the Study of Peer Influence

It is useful to briefly discuss some of the challenges particular to the study of peer relations as these issues will come into play in the subsequent discussion regarding the proposed analytical procedures for examining the relations between peer culture and academic outcomes. As previously described, the study of peer relations is complicated by processes of selection (Ryan, 2001). Individuals select into a certain group of peers based on pre-existing characteristics with similarity being one of the strongest predictors of friendship formation. As such, in any study that examines the relations between peer relations and individual outcomes, it is necessary to separate effects of selection (i.e., pre-existing similarities) from the effects of socialization.

Manski (1993) notes that individuals within the same group are likely to behave similarly due to endogenous, exogenous, and correlational effects. An endogenous effect exists when an individual's behavior varies as a result of the group's behavior. Exogenous effects refer to forces outside of the peer group, such as the school or family, that may be related to individual behavior. Correlational effects describe the fact that individuals within peer groups tend to have similar family, demographic, and educational attributes. As such, individuals within peer groups will tend to behave similarly partially due to socialization effects, but also due to pre-existing shared characteristics.

The proposed theoretical model requires that issues of selection are addressed both at the individual and school level. Just as some individuals are more likely to select into certain peer groups, some families, and therefore students, are more likely to select into certain schools. I addressed the issue of selection at both the individual and the school level using several techniques. These techniques involved including a thoughtfully-derived series of control variables, the use of lagged models, and finally testing an *alternative model*. While it is difficult to determine whether the effects of selection have been completely removed from any model, it is hoped the use of several complementary statistical procedures attempts to account for selection processes to the furthest extent possible given the data available.

Inclusion of Relevant Control Variables

Given the observation that individuals within the same peer group tend to share many pre-existing similarities, when studying the relationship between peer characteristics and individual characteristics, analysts run the risk of attributing causal effects to peers when in fact the indentified relationship is due to an unmeasured variable. As such, failing to adequately account for selection processes will falsely inflate the role of peer socialization of academic behaviors. In the present study, processes of selection are at work as individuals select an immediate peer group and as students and families select a school (and therefore, a peer culture). As such, a variety of control variables that account for individual,

familial, peer, and school characteristics were included in each model (See Tables 2 and 3 for a complete listing of variables used in each study).

Lagged Models

In each analysis, lagged models were used to predict how peers and peer culture are related to changes in individual achievement. Using lagged models is a useful (although imperfect) strategy for addressing issues of selection. If you can consider Wave 1 to be a snapshot of a participant's individual, peer and school-level characteristics, then theoretically, selection mechanisms are already thoroughly embedded in this snapshot. As such, if I use Wave 1 characteristics to predict changes in an outcome from Wave 1 to Wave 2, issues of selection are, in a sense, being held constant.

Alternative Model Testing

The complex nature of school contexts makes the isolation of peer culture effects a difficult task. While the models discussed below have taken steps to account for issues of selection and reduce the possibility that the identified significant relationships between peer culture and individual outcomes are due to omitted variables, testing an alternative model can help to further bolster the validity of the current findings. Of particular concern was the possibility that students who attend schools with a positive peer culture share a variety of individual, familial, and peer characteristics that contribute to higher levels of

achievement and engagement. These students, in turn, may be more likely to

respond to a peer culture that is promoting positive academic outcomes.

One possible solution to this problem is to consider how to test the effects

of peer culture on individual achievement and engagement if we were able to use

an experimental design and randomly assign students to schools with positive or

negative peer cultures. Under such a design, it would be more likely that the

effects of a positive peer culture could be isolated and examined with less concern

regarding omitted variable bias. While the current study was not designed to be

an experiment, I utilized the data available to mimic an experimental setting. To

do this, I first created propensity scores that described each participant's

probability of being in a school with a positive peer culture based on the

individual's SES, family composition, and parental participation in school. Next,

I divided students into four possible categories based on: 1. The student's

probability of attending a school with a positive peer culture and 2. The peer

culture of the school that the student actually attends (see Table 4).

Insert Table 4 about here

From this breakdown, students in Categories 2 and 3 are of particular

interest to the current model. Consider, for example, the students in Category 2.

These are students that have a high probability of being in a school with a positive

peer culture, but are in fact in a school with a negative peer culture. In Category 3 are students that are more likely to be in a school with a negative peer culture but, in fact, are in schools with a positive peer culture. As such, students in Categories 2 and 3 can be considered to have a "mismatch" between the peer culture they are predicted to be in, and the peer culture that they are actually in. Using these categories, I tested a series of models that examined what happens when a "mismatch" occurs between the type of peer culture that a student is predicted to be in and the peer culture of the school where the student is actually enrolled.

Research Question 1: How can peer culture be measured in the 4-H Study and Add Health?

To establish the validity of the idea that each school has its own peer culture I can assess measurement reliability and error within individuals and among individuals and schools (O'Brien, 1990). Raudenbush and Sampson (1999) argued that when creating measures of ecological settings (such as schools), traditional psychometric approaches to assessing measurement validity and reliability are not sufficient. The authors propose an "ecometric" approach to understanding measures of context, especially measures that result from aggregating individual-level data to create a hierarchal contextual measurement variable (e.g., aggregating student reports within a school to assess school climate). The ecometric approach offers two significant contributions to understanding school peer culture. First, it allows for examination of variation in

peer culture at the individual and school level. Second, this approach provides a tool for assessing the validity and reliability of the peer culture construct. Following Raudenbush and Sampson's method, the school-level scales that were created using more than one item (i.e., school-level school engagement was created using four individual-level items) were assessed using three-level hierarchal linear models examining variation among items within individuals within schools. In all, the ecometric properties of two scales in the 4-H Study (school engagement and friendship quality) and two scales in the Add Health study (school engagement and friendship intensity) were examined.

Research Question 2: Is peer culture related to individual academic outcomes?

In Chapter 1, I discussed the development of a theoretical model for testing the effects of peer culture using a developmental systems perspective. Many of the theories and research described in Chapter 1 have informed the development of the current empirical model. Given that aspects of the individual and school are thought to be involved in the relationship between peer culture and individual academic outcomes, variables at each of these levels that may offer alternative explanations for the relationship between peer culture and individual GPA and school engagement need to be included in model testing. Below, I will briefly describe the variables that will be included at the individual and school level. Theory behind the inclusion of these variables was discussed in Chapter 1.

In analyses of the 4-H Study and Add Health, demographic characteristics including age, sex, race/ethnicity, family characteristics, as well as measures of Wave 1 school engagement, GPA and emotional functioning were included at Level 1. Mother's education was used as a proxy for socioeconomic status. In addition, in the Add Health study, measures assessing characteristics of students' peer groups were included at Level 1. The school level (Level 2), included aggregated measures from student questionnaires and measures of SES, school type (private vs. other), school locale (urban, suburban, rural), and parental participation in school, as well as measures of the school's behavioral and relational peer culture.

Research Question 3: How do the relational and behavioral components of peer culture interact?

In Chapter 1, I theorized that the relational and behavioral components of a school's peer culture may interact to produce unique outcomes (see Table 1). Specifically, I hypothesized that if the relational component of peer culture sets a positive tone for peer relationships within the school, there will be a stronger relationship between the behavioral component of peer culture and student outcomes than in schools where the relational component of peer culture is more negative. I examined this hypothesis by adding an interaction term between the relational and behavioral components of peer culture to the final model that was selected under Research Question 2. A significant interaction suggesting that the

slope of the relationship between student outcomes and the behavioral component of peer culture becomes negative or flat within schools with a negative relational peer culture would support the hypothesis that the strength of the relationship between the behavioral component of peer culture and student outcomes differs depending on the tone of the relational component of the school's peer culture.

Measures: The 4-H Study

I describe below all variables used in analyses of the 4-H Study data set. Descriptions of these variables are split into two categories (individual and school-level). These categories reflect where each variable will be used in the proposed two-level hierarchal linear models.

School-Level Characteristics

School characteristics used in analyses of the 4-H study were calculated as the average score of all Fifth Grade respondents within a school. For example, to obtain a measure of school-level GPA, the average reported GPA of all students within a school at Wave 1 was aggregated to create a single, school-level GPA variable. Unless otherwise noted, this same process was used to create all of the Level 2 variables.

Socioeconomic Status. Socioeconomic status was assessed using students' reports of their mother's highest level of education achieved. Responses were coded using a 5-point scale with the categories, "Less than High School,"

"Graduated from High School," "Some College," "Graduated from College," and "Professional Training Beyond college."

Locale. School locale was measured using data from the National Center for Education Statistics Common Core of Data (NCES CCD), which places schools into one of eight possible categories. In the current study, these eight groups were consolidated into three aggregate categories: urban, suburban, and rural.

Title 1 Eligibility. The federally-funded Title 1 program provides financial assistance to schools with high numbers or high percentages of poor children to help ensure that all children can meet challenging state academic standards. This measure of Title 1 eligibility is a dichotomized variable with a score of "1" indicating the school met Title 1 eligibility criteria during Wave 1 and a score of "0" indicating that the school did not meet criteria.

Behavioral Peer Culture: GPA. Grade Point Average was assessed using a single item that asks participants to report the grades they earn in school with responses ranging from 1 (mostly A's) to 8 (mostly below D's).

Behavioral Peer Culture: School Engagement. The school engagement scale was comprised of four items. Participants were asked to respond to a three-point Likert scale and reported whether they "seldom" "usually" or "never" engage in certain school-related behaviors. Higher scores indicate higher levels of engagement. Sample items include, "How often do you come to class without

homework done?," and "How often do you come to classes without your books?" School-level reliability, calculated based on Raudenbush and Sampson's (1999) equation for assessing multi-level reliability, was .74.

Relational Peer Culture: Students Care. A measure of student's perceptions that other students in their school care about their well-being was constructed using a single item that asks students to respond to the statement "I feel that other students in this school care about me." The response scale ranged from 1 (strongly disagree) to 5 (strongly agree).

Relational Peer Culture: Friendship Quality. The four-item Friendship Quality scale was based on the Peer Support Scale (PSS; Armsden & Greenberger, 1987), which assesses adolescents' relationships with friends. Examples of items include "I trust my friends" and "My friends care about me." The scale assesses participants' views regarding the intimacy of their friendships and perceived support from friends. The response format ranges from 1 (always true) to 5 (almost never true). When all items are reverse coded, higher scores indicate higher peer support. School-level reliability, calculated based on Raudenbush and Sampson's (1999) equation for assessing multi-level reliability, was .76.

Individual-Level Characteristics

Sex. Students indicated whether they are male (1) or female (0).

Age. Students' ages were calculated by subtracting their reported birth date from the date of data collection.

Race/Ethnicity. Racial/Ethnic background was assessed with a single item, "What is your race/ethnicity?" Participants were provided with six categorical options (Asian/Pacific Islander, Black/African American, Hispanic/Latino, White, American Indian/Native American, Multiethnic), and a seventh, "Other" option, which asked students to write in their race/ethnicity if their race/ethnicity was not one of the six specified.

Socioeconomic Status. As described under the school-level measures, SES was assessed using students' reports of their mother's highest level of education achieved.

Depression. Emotional functioning in the 4-H Study was measured using the Center for Epidemiological Studies Depression Scale (CES-D). The 20-item instrument was scored using a 4-point scale ranging from 0 (rarely/none of the time) to 3 (most/all of the time) to indicate how frequently the respondent experienced symptoms during the previous two weeks. Sample items include "During the past two weeks I was bothered by things that usually don't bother me," and "During the past two weeks I have lost interest in things I usually enjoy." Chronbach's alpha of the CES-D scale for all Wave 1 participants was .81.

Maternal Warmth. Maternal warmth was measured with questions assessing behaviors that indicate acceptance, nurturance, support, and a feeling of being loved and wanted by the parent (Gray & Steinberg, 1999). Examples of maternal warmth items include "My mother speaks to me in a warm and friendly way" and "My mother cheers me up when I am upset." The response format ranged from 0 (almost never) to 4 (almost always). Higher scores indicated higher warmth and nurturance. Cronbach's alpha of the maternal warmth scale for all Wave 1 participants was .94.

Parental Involvement. Four items were used to create a scale indicating parents' roles in student academic endeavors. A sample item is "How often does one of your parents ask about your homework?" Each item is measured using a five point Likert-type scale ranging from 0 (never) to 4 (very often) with a higher score reflecting greater parental involvement. Cronbach's alpha of the parental involvement scale for all Wave 1 participants was .81.

Academic Competence. The Self-Perception Profile for Children (SPPC; Harter, 1982, 1983) was used to index academic competence, social competence, and self-worth. The SPPC assesses global self-worth (indexing feelings of self-esteem, in general) and perceived competence with regard to specific domains of functioning. The academic competence scale asked students to report how they perceived their academic performance. Cronbach's alpha of the academic competence scale for all Wave 1 participants was .70.

Social Competence. As outlined under the description of the current measure of "Academic Competence," the measure of social competence was derived from the SPPC. The social competence scale asks students to report their self-perceived popularity with peers. Each item is scored from 1 to 4, where a score of 1 indicates low perceived competence and a score of 4 reflects high perceived competence. Cronbach's alpha of the social competence scale for all Wave 1 participants was .62.

Self-Worth. As outlined under the description of the current measure of "Academic Competence," the measure of self-worth was derived from the SPPC. The self-worth scale was a measure of students global feelings of self-worth and self-esteem. Each item is scored from 1 to 4, where a score of 1 indicates low perceived competence and a score of 4 reflects high perceived competence. Cronbach's alpha of the self-worth scale for all Wave 1 participants was .69.

GPA. As described under school-level measures, GPA was assessed using a single item that asks participants to report the grades they earn in school with responses ranging from 1 (mostly A's) to 8 (mostly below D's).

School Engagement. As described under the school-level measures, the school engagement scale was comprised of four items that asked students to report their degree of engagement in school-related behaviors. Chronbach's alpha of the school engagement scale for all Wave 1 participants was .78.

Friendship Quality. As described under the school-level measures, the four-item Friendship Quality scale was based on the Peer Support Scale (PSS; Armsden & Greenberger, 1987), which assesses adolescents' relationships with friends. Cronbach's alpha of the friendship quality scale for all Wave 1 participants was .89.

Measures: The Add Health Study

Below is a description of all variables used in analyses of the Add Health data set. Descriptions of these variables are split into two categories (individual and school-level). These categories reflect where each variable will be used in the proposed two-level hierarchal linear. For several of the measures used in the current analyses (e.g. school engagement, depression, friendship quality), the same variables were obtained from two different sources – the in-school survey and the Wave 1 at-home survey. For example, if a participant completed an in-school questionnaire and then was selected to be part of the at-home survey, any of the items from the in-school survey that overlap with the at-home survey would have been assessed twice. To address this, I used data from the in-school survey first when available. If in-school survey data was not available for a participant, I filled in the missing responses with data from his/her at-home survey.

School-Level Characteristics

Unless otherwise noted, school-level characteristics were calculated as the average response of all individuals within each school. When possible, data

available from the in-school survey, which contains 90,118 participants, were used to create the aggregated school-level constructs. Other school-level measures were derived from Add Health's school administrator's questionnaire and from the NCESD CCD.

Socioeconomic Status. On the in-school survey, students were asked to report the highest level of education their mother achieved. Responses were coded onto a 5-point scale using the categories, "Less than High School," "Graduated from High School," "Some College," "Graduated from College," "Professional Training Beyond college." To calculate school-level SES, average maternal education was calculated for each school.

School Type. School type (i.e., public, private, or catholic) was derived from a question on the School Administrator Questionnaire.

Locale. School locale (i.e., urban, suburban, rural) was measured using Add Health's listing of school locale from the NCESD CCD.

Percent of Teachers with Master's Degree. In the School Administrator Questionnaire, the administrator reports the percent of teachers in his/her school that hold a Master's degree or higher.

Percent of Parents in PTO. In the School Administrator Questionnaire, the administrator reports the percent of parents that participate in the school's Parent Teacher Organization.

Behavioral Peer Culture: GPA. School-level GPA was calculated using students' self-report GPA information from the in-school questionnaire. Data from the in-school survey rather than transcript data was selected to calculate school-level GPA because approximately 90,000 students provided self-report GPA data in the in-school questionnaire. Transcript data were available for approximately 12,500 of these students.   As such, it was determined that capitalizing on the large amount of data available from the in-school questionnaire would create the most accurate measure of school-wide GPA.

Behavioral Peer Culture: School Engagement. School engagement was assessed using the average of four items that asked students about their emotional connections and engagement in their schools. For example, students were asked to respond to the statement, "You are happy to be at your school." Responses ranged from 1 (strongly agree) to 5 (strongly disagree). All student responses with in school were averaged to create a measure of school-wide engagement. School-level reliability, calculated based on Raudenbush and Sampson's (1999) equation for assessing multi-level reliability, was .81.

Relational Peer Culture: Students have Trouble Getting Along. Using a single item, students were asked, "Since the beginning of this school year, how often have you had trouble getting along with students?" Responses ranged from 1 (never) to 5 (everyday). The school-level measure of this construct reflects the average score of all students within a school.

Relational Peer Culture: Reciprocated Best-Friendships. In the in-school questionnaire, students were asked to identify their ten closest friends. From this information, analysts at Add Health generated a variable indicating whether an individual's best friend nomination was reciprocated. The participant received a score of "1" on this variable if he/she was nominated as one of his/her best friend's friends and a score of "0" if the individual was not nominated as one of his/her best friend's friends. Within each school, I then calculated the percent of students who had reciprocated best friendships by dividing the number of individuals who had a score of "1" on this variable by the number of students who participated in the in-school survey.

Relational Peer Culture: Friendship Intensity. After students identified their ten closest friends, they were then asked a series of follow-up questions regarding the amount of time they spent with friends. For example, students were asked whether they spoke with each peer on the phone within the past seven days, and whether they had been to each peer's home in the last seven days. To create a scale of friendship intensity, I summed the number of positive responses that students provided regarding their closest friend (i.e., the first friend nominated). To generate a school-wide assessment of this measure, I averaged the scores of all students within a school. School-level reliability, calculated based on Raudenbush and Sampson's (1999) equation for assessing multi-level reliability, was .79.

Individual-Level Characteristics

Sex.   Students indicated whether they were male (1) or female (0).

Age. Age of Add Health participants was calculated by subtracting the participant's date of birth from the date of their Wave 1 in-school participation.

Race/Ethnicity. Racial/Ethnic background was assessed with a single item, "What is your race/ethnicity?" Participants were provided with six categorical options (Asian/Pacific Islander, Black/African American, Hispanic/Latino, White, American Indian/Native American, Multiethnic), and a seventh, "Other" option, which asked students to write in their race/ethnicity if their race/ethnicity was not one of the six specified.

Socioeconomic Status. Students' reports of their mother's highest level of education was used to assess SES.

Mother Cares. A single item, which asked participants, "How much do you think your mother cares about you?" was used to assess participants' maternal relationships. Response options ranged from 1(not at all) to 5(very much).

Depression. Emotional functioning was assessed using the Add Health feelings scale. The feelings scale is based on the CES-D (the same measure used to assess emotional functioning in the 4-H Study). The participants responded to a series of 19 items rating how often each statement was true during the last month using a scale from 0 (never or rarely) to 3 (most of the time or all of the time). A sample item is, "You felt that you were just as good as other people."

Chronbach's alpha on the depression scale for all individuals who participated in the Wave 1 in-home survey was .89.

Peer Group GPA. Peer group GPA was calculated as the average GPA of all individuals that a student identified in his/her friendship nominations. Self-report GPA from the in-school questionnaire was used to assess peer group GPA because self-report GPA was available for approximately 90,000 participants, which allowed me to generate peer GPA scores for a larger number of participants then if I had relied on transcript GPA data.

Peer Group School Engagement. The school engagement scale described under school-level measures was also used to calculate the level of school engagement for each of an individual's nominated friends. The average score for each individual's peer group was then calculated to derive a measure of peer group school engagement.

Friendship Intensity. The friendship intensity scale described under school-level measures was also used to assess individual friendship intensity. Chronbach's alpha of the Friendship Intensity scale for all Wave 1 participants was .81.

GPA. Individual's overall GPA in 1994 and 1995 was derived from their high school transcripts. Transcript GPA was calculated as the average of all of an individual's grades (in academic subjects such as English/Language Arts,

Mathematics, Social Studies, and Science) over one school year. The scale follows a traditional GPA scale, ranging from 0.0 ("F") to 4.0 ("A").

School Engagement. School engagement was calculated in the same manner described under school-level measures. Chronbach's alpha of the School Engagement scale for all Wave 1 participants was .78.

Chapter 4

RESULTS

THE 4-H STUDY

Research Question 1: How can peer culture be measured in the 4-H Study?

Among the school-level measures used in the 4-H Study, two scales (school engagement and friendship quality) were comprised of multiple items and therefore were able to be tested using Raudenbush and Sampson's (1999) ecometric approach. The ecometric properties of school-level scales were assessed using three-level hierarchal models with items nested within individuals nested within schools. Using these models, intraschool correlation coefficients were calculated to determine the amount of variability in the scale that lies between schools. Scores range from 0-1 with higher scores suggesting a greater amount of agreement among individuals within schools and supports the validity of the scale as a school-level measure. The coefficients for both school engagement and friendship quality was were .84, suggesting that 84% of the variation in these scale scores lies between schools. Ecometric model results for the 4-H Study can be found in Table 5.

Insert Table 5 about here

Research Question 2: Is peer culture related to individual academic outcomes?

The ten imputed data sets that were created in SAS 9.2 were imported in to HLM 6.08, where two-level hierarchal regression models with individuals nested within schools were tested to estimate a series of models predicting first GPA and then school engagement.

Outcome: GPA

An initial series of models tested the significance of age and age^2 terms, the existence of a random effect of sex at Level 2, and the possibility of a significant interaction between age and sex. Results from these models suggested that age was the only significant predictor of Wave 3 GPA, and that there was not a random effect of sex at the school level. As such, the age^2 term, the interaction between age and sex, and the random effect of sex were removed from subsequent models.

In the first model tested that included predictors of interest, a series of individual characteristics from Wave 1 (sex, age, race/ethnicity, SES, depression, maternal warmth, parental involvement, academic competence, social competence, self-worth, GPA, school engagement, and friendship quality) were used to predict Wave 2 GPA. Results suggested that age, race/ethnicity, mother's education, depression, parental involvement, academic competence, social competence, and Wave 1 GPA were significantly related to Wave 2 GPA. In the

next model, school-level predictors including SES, locale, Title 1 eligibility, GPA, school engagement, students care, and friendship quality were added to the model (see Table 6, Model 2). One measure of the behavioral component of peer culture, school-level GPA, was significantly and positively associated with individual Wave 2 GPA, suggesting that as a school's behavioral peer culture becomes more positive, individual achievement improves. No other measures of behavioral or relational peer culture were significantly related to GPA. In regard to the individual-level predictors, there was no change in the pattern of significance.

Testing for Homogenous Effects

In the following model, I was interested in examining whether the effect of school-level GPA was homogeneous across all levels of individual GPA. In particular, I was interested in testing whether the effect of school-level GPA was stronger among students who had higher individual-level GPAs. As such, I added a cross-level interaction term between individual and school-level GPA. Individual and school-level predictors that were significant in Model 1 retained significance. The interaction between individual GPA and school GPA was non-significant ($\beta = 0.117$ [.095], $p=.224$), suggesting that the relationship between Wave 1 school-level GPA and individual GPA at Wave 2 was uniform across varying levels of achievement. As such, the relationship between behavioral peer

culture and individual GPA at Wave 2 does not vary depending on individual GPA at Wave 1.

Insert Table 6 about here

Outcome: School Engagement

An initial series of models tested the significance of age and age^2 terms, the existence of a random effect of sex at level 2, and the possibility of a significant interaction between age and sex. Results from these models suggested that age was the only significant predictor of Wave 2 school engagement, and that there was not a random effect of sex at the school level. As such, the age^2 term, the interaction between age and sex and the random effect of sex were removed from subsequent models.

In the first model testing predictors of interest, a series of individual-level variables from Wave 1 of the 4-H Study were included (sex, age, race/ethnicity, SES, depression, maternal warmth, parental involvement, academic competence, social competence, self worth, GPA, school engagement, and friendship quality). In this model, race/ethnicity, mother's education, depression, maternal warmth, parental involvement, academic competence, Wave 1 GPA, Wave 1 school engagement, and friendship quality were all significant predictors of Wave 2 school engagement. In the next model, school-level predictors including SES,

locale, Title 1 eligibility, GPA, school engagement, students care, and friendship quality, were added to the model. All four measures of peer culture were found to significantly predict individual school engagement. Friendship quality ($\beta = 0.829$ [.322], $p < .01$), a measure of relational peer culture, was significantly and positively related to school engagement. Similarly, school-level school engagement ($\beta = 0.345$ [.345], $p < .01$) was also a significant predictor of individual school engagement. Each of these relationships suggested that as the behavioral and relational components of peer culture become more positive, student engagement also increases.

Testing for Homogenous Effects

In the following model, I was interested in testing whether the effects of school-level friendship quality varied according to student's individual level of school engagement. In particular, I wanted to test whether the relationship between Wave 2 school engagement and school-level friendship quality was stronger among students with higher levels of school engagement at Wave 1. As such, I added a cross-level interaction term between individual school engagement and school-level friendship quality. The interaction term was not significant ($\beta = -0.021$ [.080], $p > .05$), suggesting that the relationship between school-level friendship quality and Wave 2 school engagement is constant across students with varying levels of school engagement at Wave 1.

Insert Table 7 about here

Research Question 3: How do the relational and behavioral components of peer culture interact?

To address Research Question 3, I added school-level interaction terms to the models of GPA and school engagement. The interaction terms were included to test the hypothesis that the relationship between behavioral peer culture and individual academic outcomes may vary based on the relational characteristics of a school's peer culture. In each model that was tested, I included two measures of behavioral peer culture (GPA and school engagement) and two measures of relational peer culture (students care and friendship quality). As such, there were four possible terms that could be used to examine interactions between behavioral and relational peer culture (GPA X students care, GPA X friendship quality, school engagement X students care, and school engagement X friendship quality).

A third model was tested to examining the possible effects of relational X behavioral peer culture in predicting both GPA (see Table 6, Model 3) and school engagement (see Table 6, Model 3). Results indicated that there were no significant interactions between behavioral and relational peer culture in either model. I had hypothesized that in schools with a positive relational peer culture, where student interactions are marked by caring and high-quality friendships, the

association between behavioral peer culture and individual academic outcomes would be more pronounced. However, the lack of significance among the behavioral X relational peer culture interactions suggests that there was no evidence to support the hypothesis that the relationship between behavioral peer culture and individual GPA and school engagement would vary depending on a school's relational peer culture.

THE ADD HEALTH STUDY

Research Question 1: How can peer culture be measured in Add Health?

Among the school-level measures used in the Add Health Study, two scales (school engagement and friendship intensity) were comprised of multiple items and therefore were able to be tested using Raudenbush & Sampson's ecometric approach. The ecometric properties of school-level scales were assessed using three-level hierarchal models (Raudenbush & Sampson, 1999) with items nested within individuals nested within schools. Using these models, intraschool correlation coefficients (ICC) were calculated to determine the amount of variability in the scale that lies between schools. Scores range from 0-1 with higher ICC scores suggesting a greater amount of agreement among individuals within schools and supports the validity of the scale as a school-level measure. The ICC for school engagement and friendship intensity were .92 and .88 respectively. Ecometric model results for the Add Health Study can be found in Table 8.

Insert Table 8 about here

Research Question 2: Is peer culture related to individual academic outcomes?

The ten imputed data sets that were created in SAS 9.2 were imported in to HLM 6.08, where two-level hierarchal regression models with individuals nested within schools were tested to estimate a series of models predicting first Wave 2 GPA and then Wave 2 school engagement.

Outcome: Grade Point Average

An initial series of models tested the significance of age and age^2 terms, the existence of a random effect of sex at level 2, and the possibility of a significant interaction between age and sex. Results from these models suggested that age and the age X sex interaction term were significant predictors of Wave 2 GPA. In addition, there was a random effect of sex at Level 2, suggesting that the relationship between sex and GPA varies across schools. As such, the age, age X sex interaction term, and a random effect of sex at Level 2 were retained in subsequent models.

In the first model tested that included predictors of interest, a series of individual characteristics from Wave 1 (sex, age, race/ethnicity, SES, mother cares, depression, maternal involvement, GPA, and school engagement) were

used to predict Wave 2 GPA. Results suggested that race/ethnicity, depression, and Wave 1 GPA were significantly related to Wave 2 GPA (See Table 9, Model 1). In the next model, school-level predictors including SES, school type, locale, percent of parents involved in PTOs, percent of teachers with a M.A., GPA, school engagement, students have trouble getting along, percent of students with reciprocated best friendships, and friendship intensity (see Table 9, Model 2) were added. School-level GPA, a measure of behavioral peer culture, was the only school-level predictor that significantly predicted individual Wave 2 GPA (β = 0.624 [.099], $p < .001$). That is, as school-level GPA increases, individual GPA also increases. This finding aligns with results of the 4-H Study analyses. In regard to the individual-level predictors, there was no change in the pattern of significance.

Peer Group Characteristics

As previously discussed, the Add Health study offers the opportunity to consider the relationship between peer group characteristics and individual academic outcomes. To capitalize on this feature of the Add Health study, I next added three measures of peer group characteristics: peer group GPA, peer group school engagement and friendship intensity. Results indicated that peer group GPA at Wave 1 (β = 0.082 [.027], $p < .01$) significantly predicted individual Wave 2 GPA. It is important to note that in spite of the inclusion of these additional peer variables, the relationship between school-level GPA and

individual GPA retained significance, demonstrating that role of a school's behavioral peer culture in predicting individual GPA was significant even after accounting for individual and peer group characteristics.

Testing Homogenous Effects

In the following model, I was interested in examining whether the effect of peer culture differs across peer groups. In particular, I was interested in testing an interaction between peer group GPA and school GPA to assess whether the relationship between peer group GPA and individual GPA differs depending on the school-level GPA. To test this interaction, I first added a random effect of peer group GPA at Level 2. This term was significant ($p < .001$) suggesting that the relationship between peer group GPA and individual GPA varies across schools. When I added cross-level interaction between peer group GPA and school GPA, however, this term was not significant ($\beta = -0.006$ [.068], $p > .05$). As such, the hypothesis that the relationship between peer group GPA and individual GPA may differ depending on a school's behavioral peer culture (as assessed by school-level GPA), was not supported.

Insert Table 9 about here

Outcome: School Engagement

An initial series of models tested the significance of age and age^2 terms, the existence of a random effect of sex at level 2, and the possibility of a significant interaction between age and sex. Results from these models suggested that age and the age X sex interaction term were significant predictors of Wave 2 school engagement. In addition, there was a random effect of sex at Level 2, suggesting that the relationship between sex and school engagement varies across schools. As such, the age, age X sex interaction term and a random effect of sex at Level 2 were retained in subsequent models.

When interpreting the Add Health models used to predict school engagement, it is important to keep in mind that higher scores on the school engagement measure are actually associated with lower levels of school engagement. In the first model tested that included predictors of interest, a series of individual characteristics from Wave 1 (sex, age, race/ethnicity, SES, depression, maternal involvement, GPA, and school engagement) were used to predict Wave 2 school engagement. Results suggested that race/ethnicity, SES, depression, mother cares, Wave 1 GPA and school engagement, were significantly related to Wave 2 school engagement (see Table 10, Model 1). In the next model, school-level predictors including SES, school type, locale, percent of parents involved in PTOs, percent of teachers with a M.A., school engagement, GPA, students have trouble getting along, percent of students with reciprocated

best friendships, and friendship quality (see Table 10, Model 2) were added. Two measures of relational peer culture, school-level reciprocated best-friendships (β = -0.547 [.138], $p < .01$) and friendship intensity (β = 0.165 [.056], $p < .001$), as well as GPA (a measure of behavioral peer culture) significantly predicted individual Wave 2 school engagement. Interestingly, these results suggested that in schools where there were more reciprocated best friendships, individual school engagement was higher compared with schools with fewer reciprocated best friendships. However, in schools where students spend a great amount of time with their friends, school engagement is lower than in schools where students spend less time with friends. In all, these results support the hypothesis that above and beyond demographic characteristics of the school, aspects of the behavioral and relational peer culture are significantly related to student academic outcomes.

Peer Group Characteristics

In the next model, I added three measures assessing characteristics of students' immediate peer groups: peer group GPA, peer group school engagement, and friendship intensity. Both peer group GPA (β = -0.090 [.030], $p < .01$) and school engagement (β = 0.083 [.030], $p < .01$) were significant predictors of individual school engagement. I was next interested in examining potential interactions among peer group characteristics and characteristics of the school's peer culture. To prepare to test cross-level interactions I first assessed

whether there were random effects of peer group GPA and peer group school engagement. Results suggested significant random effects of both peer group GPA and school engagement. Thus, random effect terms for both of these variables were retained in subsequent models.

Testing for Homogenous Effects

In the next model, I tested cross-level interactions between peer group characteristics and the peer culture to assess the possibility that the relationship between peer group characteristics and individual school engagement varies according to a school's peer culture. Based on significant findings from the previous model, I selected school engagement as the measure of behavioral peer culture to include in the interaction term. Cross-level interactions between peer group GPA (β = .043 [.101], p >.05) and peer group school engagement (β = 0.082 [.117], p > .05) were not significant. Next, I examined the possibility that peer group characteristics may interact with a school's relational peer culture. Again using significant findings regarding peer culture from Model 3, I included cross-level interactions between peer group GPA and school-level percent of reciprocated best-friendships and school-level friendship intensity and peer group school engagement and school-level percent of reciprocated best-friendships and school-level friendship intensity. None of the four interaction terms tested achieved significance suggesting that the relationship between peer group

characteristics and individual school engagement does not vary according to a school's peer culture.

Insert Table 10 about here

Research Question 3: How do the relational and behavioral

components of peer culture interact?

To address Research Question 3, I added school-level interaction terms to the models of GPA and school engagement. The interaction terms were included to test the hypothesis that the relationship between behavioral peer culture and individual academic outcomes may vary based on the relational characteristics of a school's peer culture. In each model tested, I included two measures of behavioral peer culture (GPA and school engagement) and three measures of relational peer culture (trouble with students, percent of reciprocated best friendships, and friendship intensity). As such, there were six possible terms that could be used to examine interactions between behavioral and relational peer culture.

A third model was tested to examining the possible effects of relational X behavioral peer culture in predicting both GPA (see Table 7, Model 3) and school engagement (see Table 7, Model 3). Results indicated that there were no significant interactions between behavioral and relational peer culture in either

model. It was thought that in schools with a positive relational peer culture, where student interactions are marked by caring, and high-quality friendships, the association between behavioral peer culture and individual academic outcomes would be more pronounced. However, the lack of significance among the behavioral X relational peer culture interactions suggests that there was no evidence to support the hypothesis that the relationship between behavioral peer culture and individual GPA and school engagement would vary depending on a school's relational peer culture.

An Alternative Model

As previously discussed (See Chapter 3 and Table 4), the alternative model attempts to address the possibility that students who attend schools with a positive peer culture may share individual, familial, and peer characteristic that contribute to higher achievement and engagement than students who attend schools with a negative peer culture. These students, in turn, may be more likely to respond to a peer culture that is promoting positive academic outcomes. As such, the alternative model identifies students that have a low probability of attending a school with a positive peer culture, but, in fact, attend a school with a positive peer culture. Similarly, I also identified students who have a high probability of attending a school with a positive peer culture, but, in fact attend a school with a negative peer culture (See Table 4). By isolating these groups of "mismatched" students (that is, students whose probability of being in a certain

peer culture does not match the reality of their school's peer culture), I can approximate an experimental design and reduce the possibility that findings are effected by omitted variable bias.

Identifying "Mismatched" Students

All alternative model analyses were pursued in the Add Health study due to the availability of a larger sampling of students within schools. In order to identify "mismatched" students, that is, students who fall into Categories 2 and 3 (See Table 4), I first categorized each school as having either a positive or negative peer culture. I categorized schools based first on their relational peer culture (using the percent of students with reciprocated best friendships measure) and second on their behavioral peer culture (using school-level GPA). Schools were identified as having a positive peer culture if they fell within the upper 75th percentile on these measures and having a negative peer culture if they fell within the lower 25th percentile on these measures. I then generated propensity scores that assessed the probability of attending a school with a positive peer culture based on individual's Wave 1 SES, GPA, and school engagement.

Once the propensity scores were created, I identified individuals in the upper and lower quartiles of the propensity scores. Individuals in the upper 75th percentile of the propensity score variable had the highest probability of attending a school with a positive peer culture while individuals in the lower 25th percentile of the propensity score variable had the lowest probability of attending a school

with a positive peer culture. I then identified subsets of students who could be placed in Category 2 (i.e., had a high probability of attending a school with a positive peer culture but attended a school with a negative peer culture) and Category 3 (i.e., had a low probability of attending a school with a positive peer culture but in fact attended a school with a positive peer culture).

Outcome: GPA

Initial analyses consisted of ordinary-least-squares regression models that used propensity to attend a school with a positive peer culture and Category 3 status to predict Wave 2 GPA. Results suggested that there were no differences in GPA between students who have a low probability of attending a school with a positive peer culture but were in fact in a school with a positive peer culture had and students who had a low probability of attending a school with a positive peer culture and attended a school with a negative peer culture. These results were replicated when examining Category 2 students. There were no significant differences in GPA between students who had a high probability of attending a school with a positive peer culture but in fact attended a school with a negative peer culture and individuals who had a high probability of attending a school with a positive peer culture and were attending a school with a positive peer culture.

In the next step, I conducted a more rigorous test of the alternative model and entered the Category 2 and Category 3 dichotomous variables separately into the two-level hierarchal regression models examined under Research Question 2.

These models were more rigorous than the initial ordinary-least-squares regression models because they controlled for a variety of individual and school-level characteristics and accounted for the clustering of students within schools to produce robust standard errors. Results demonstrated that neither Category 2 nor Category 3 status significantly predicted Wave 2 GPA, suggesting that under this alternative model, peer culture does not significantly predict GPA for "mismatched" individuals.

Outcome: School Engagement

Initial analyses again of consisted ordinary-least-squares regression models that used propensity to attend a school with a positive peer culture and Category 3 status to predict Wave 2 school engagement. Results mirrored findings from the models that used GPA as an outcome but interestingly, the direction of the findings were reversed. That is, students who had a low probability of attending a school with a positive peer culture but were in fact in a school with a positive peer culture were significantly less engaged than students who had a low probability of attending a school with a positive peer culture and attended a school with a negative peer culture ($\beta = 0.223$ [.026], $p < .001$). Similarly, when examining Category 2 students, those who had a high probability of attending a school with a positive peer culture but in fact attended a school with a negative peer culture were also less engaged than individuals who had a

high probability of attending a school with a positive peer culture and were attending a school with a positive peer culture ($\beta = 0.321$ [.018], $p < .001$).

In the next step, I conducted a more rigorous test of the alternative model and entered the Category 2 and Category 3 dichotomous variables separately into the two-level hierarchal regression models examined under Research Question 2. As noted previously, these models were a more rigorous test than the initial ordinary-least-squares models because they controlled for a variety of individual and school-level characteristics and accounted for the clustering of students within schools to produce robust standard errors. Results demonstrated that neither Category 2 nor Category 3 status significantly predicted Wave 2 school engagement, suggesting that under this alternative model, peer culture does not significantly predict school engagement for "mismatched" individuals.

Chapter 5

DISCUSSION

This study is among the first of its kind, examining the idea that each school contains a unique peer culture that can play an important role in students' school engagement and academic achievement. The concept of peer culture was hypothesized to involve both a relational and a behavioral component. The relational component of peer culture captures, at the school-level, the quality and nature of student interactions. The behavioral component reflects the academic behaviors of the student body as a whole. In the current study, the role of peer culture in predicting students' academic outcomes was examined using two large, longitudinal data sets: the 4-H Study of Positive Youth Development and the National Longitudinal Study of Adolescent Health (Add Health).

Results from both the 4-H Study and Add Health supported the idea that peer culture is related to student GPA and school engagement. In analyses of both data sets, the effects of peer culture attained significance even after accounting for a wide range of individual and school-level characteristics. In all, results suggested that the relationship between peer culture and academic functioning varies depending on the academic outcome being predicted – behavioral peer culture appears to play a significant role in predicting individual GPA, but relational peer culture predicts individual school engagement. In addition, evidence from the Add Health study demonstrated that even when

accounting for school-wide peer culture, immediate peer groups continue to play a role in individual academic behaviors, suggesting that the immediate peer groups and peer culture play separate, but potentially equally important roles in predicting academic outcomes.

Replication of Findings in the 4-H and Add Health Samples

One of the most noteworthy findings was the fact that analyses of the 4-H Study and Add Health resulted in remarkably similar conclusions. In both studies, behavioral peer culture predicted individual GPA, and both relational and behavioral peer culture predicted school engagement. Given the differences in the 4-H and Add Health samples noted in the Method section, the fact that findings were replicated across studies attests to the potential importance of peer culture and its constant presence across adolescence. Measures of peer culture in the 4-H study reflected the aggregated responses of all 5th Grade students within a school. Add Health measures of peer culture contained the aggregated findings of potentially all students within a school from Grades 7-12. The fact that peer culture was found to play a similar role under both these constructions suggests the robustness of the peer culture effect and demonstrates that the relationship between student outcomes and peer culture can be detected starting in elementary school and persisting throughout students' high school years.

One difference that did arise between the 4-H Study and Add Health was the finding that school-wide GPA predicted individual school engagement in the

4-H Study but not in Add Health. Given the differences in the age ranges of the 4-H and Add Health samples, it is tempting to begin to construct developmental hypotheses regarding the relationship between school-wide GPA and individual school engagement. However, this difference could also be a result of the fact that I was working with extant data and within each study these constructs were measured in slightly different manners. As such, these divergent findings could be the result of measurement differences across studies or a product of the aforementioned differences in samples. It is difficult to determine whether this difference is a by-product of methodology or an actual substantive finding relating to the composition of the two samples.

The Independent Roles of Relational and Behavioral Peer Culture

It was originally hypothesized that the relational and behavioral components of peer culture both contribute to student achievement and school engagement and that relational and behavioral peer culture would interact to produce unique outcomes within schools. In models using peer culture to predict individual GPA, school-wide GPA (a measure of behavioral peer culture) was related to individual GPA. However, none of the measures of relational peer culture were related to individual GPA. Alternately, in models designed to predict individual school engagement, measures of relational peer culture were significant. The distinction between aspects of peer culture that predicted GPA

and those that predicted school engagement suggests that the behavioral and relational components of peer culture may be working independently.

Additional support for the idea that relational and behavioral peer culture act independently is found in the results of analyses under Research Question 3 I tested a series of terms that modeled possible interactions between behavioral and relational peer culture both in the prediction of individual GPA and school engagement. None of the interaction terms attained significance. As such, my original hypothesis, that a positive relational peer culture would strengthen the messages from the behavioral component of peer culture (See Table 1) was not supported. The lack of significance of the interaction terms tested under Research Question 3 suggests that either there is no consistent relationship between behavioral and relational peer culture or that the two constructs act in parallel.

These findings, however, need to be considered in light of prior research suggesting that school engagement is a precursor to GPA (Fredricks, Blumenfeld, & Paris, 2004; Li & Lerner, 2011). That is, higher levels of school engagement tend to beget higher levels of achievement. As such, it begs the question whether the relationship between relational peer culture and school engagement is a necessary antecedent to the relationship between school-level GPA and achievement. Given that these constructs – GPA, school engagement, behavioral peer culture, relational peer culture – seem to be highly interrelated, it is likely

that the relationships identified in the current study are part of a cyclical, self-reinforcing process and these results have captured a one-point-in-time snapshot.

Peer Culture and Immediate Peer Groups

In addition to considering the relations among peer culture and academic functioning, Add Health also afforded the opportunity to examine the relations among immediate peer group characteristics, peer culture, and individual academic outcomes. By adding measures of peer group GPA, school engagement, and friendship intensity, I was able to observe whether the effects of peer culture were sustained when characteristics of students' immediate peer groups were taken into consideration. When immediate peer group characteristics were added to the model, these terms attained significance, but the previously observed relationships between peer culture and academic outcomes remained simultaneously significant, suggesting that peer culture and immediate peer groups play distinct but significant roles in academic functioning.

Given that both peer group characteristics and peer culture were significant predictors of student academic outcomes, a second question that arose was whether the effects of peer group characteristics vary according to a school's peer culture. I first identified significant random effects of peer group GPA and school engagement at the school-level. This finding is not surprising given previous research suggesting that the presence of high quality friendships had a stronger influence on student outcomes in lower-SES schools than in higher-SES

schools (Crosnoe, Cavanagh, & Elder, 2003). While there were significant random effects of peer group GPA and school engagement, the interactions between peer group characteristics and peer culture were not significant. As such, we are left with a question unanswered. What school-level characteristics contribute to the random effects of peer group GPA and friendship intensity? The relationship between peer group characteristics and individual academic outcomes varies across schools, but this variation is not related to a school's peer culture.

School-Level Friendship Intensity and School Engagement

While the possibility that negative aspects of a peer culture could be related to lower student achievement and engagement was considered in the literature review, this idea was not formally tested in any of the analyses. However, a negative relationship between relational peer culture and individual school engagement was identified in the Add Health analyses. School-wide friendship intensity was negatively related to individual school engagement. The measure of friendship intensity assessed how often students interacted with their peers (e.g., spoke on the phone, went to their house, spent time with them on the weekend). It is important to note that, the friendship intensity variable was a measure of the amount of time spent with peers but not an assessment of the quality of these interactions. In addition, when this measure was constructed, it was not required that the peer relationships in question were reciprocated. As such, individuals could have been describing the amount of time they spent with

unreciprocated friends – another reason to believe that friendship quality is not encompassed in the construction of the friendship intensity measure. In this light, this finding suggests that, in schools where the tendency is for students to spend a significant amount of time with peers, academic achievement and school engagement may be lower than in schools where students spend less time with peers.

It is also possible that high levels of friendship intensity at the school level are reflective not only of students spending a great amount of time with peers – but also indicative of a lack of time spent in structured activities. Participation in school clubs, sports, and activities organized by non-school organizations are related to adolescent outcomes (Eccles & Barber, 1999). For example, students who participate in school-based activities during high school tend to demonstrate higher achievement and are more likely to attend college (Mahoney, Cairns, & Farmer, 2003). Perhaps this finding suggests not that spending a large amount of time with peers is detrimental, but rather that if students are spending large amounts of unstructured time with peers outside of school, they may be less likely to be participating in structured activities.

Interestingly, immediate peer group friendship intensity was positively related to school engagement. That is, adolescents who spend more time with the individuals they identify as friends tend to be more engaged in school. This finding helps to shed further light on the significant relationship between school-

wide friendship intensity and individual school engagement. If friendship

intensity within immediate peer groups is actually related to positive student

outcomes, this lends further support to the idea that spending time with peers is

not in and of itself harmful. Rather, large amount of time spent with peers may

have a negative relationship with school engagement when it means that students

are spending less time in structured settings. The divergence in agreement

between the peer culture's and the immediate peer group's role in individual

school engagement also suggests that these two peer contexts may have unique,

independent relationships with student academic outcomes. Relationship

characteristics that may be beneficial to student engagement at the level of the

immediate peer group may not be beneficial if they characterize the entire student

body.

The Alternative Model

The alternative model examined the idea that if students who were more

likely to be enrolled in schools with a negative peer culture were actually enrolled

in a school with a positive peer culture, these students would demonstrate better

academic performance than students who had a high probability of attending a

school with a negative peer culture and did in fact attend a school with a negative

peer culture. Results from the initial regression analysis suggested that there were

no significant differences in GPA between mismatched students, that is, students

who attended a school with a positive peer culture but had a high probability of

attending a school with a negative peer culture, had significantly higher GPAs and their counterparts who attended schools with a negative peer culture. However, mismatched students were significantly less engaged in school than their counterparts.

The ultimate, final model tested suggested that there were no differences in achievement or engagement between these two groups of students. However, this initial finding draws attention to the idea that for certain students, a positive peer culture may be detrimental to school engagement. This finding suggests that a positive peer culture in and of itself is not sufficient to promote positive student outcomes. Rather, it appears that there may need to be an alignment between student characteristics and school characteristics to see the positive benefits of peer culture. This finding corresponds with goodness-of-fit theories (e.g., Chess & Thomas, 1999; Eccles & Wigfield, 1997), which suggest that developmental outcomes are optimized when characteristics of the environment compliment characteristics of the individual. In line with this theory, one can conclude that simply placing students in a school with a positive peer culture would not suffice to improve student academic outcomes. Rather, it may be more beneficial to try to generate positive peer culture in the schools that students originally were assigned.

Limitations

In all, this study represents one of the first attempts to study and quantify the phenomenon of peer culture. This study used two extant, longitudinal data sets to examine the relations among peer culture and student academic outcomes. The fact that several major findings were replicated across two data sets suggests that the current findings may be robust across a variety of samples. However, while the use of extant longitudinal data provided many benefits, there are also several limitations inherent to the use of such data. As with many longitudinal studies, both the 4-H and Add health studies suffered from sample attrition across waves. Overtime, study attrition can cause samples to become less representative of the original population they are intended to represent. The use of sample weights in the Add Health study helped to partly correct for this potential bias.

The use of extant data allowed me to examine peer culture among large, longitudinal samples. However, the fact that I used existing data also used served as a limitation in that measures of peer culture were derived from the variables that were available in each study and did not necessarily represent the strongest or most accurate conceptualizations of the construct. While a variety of operationalizations of peer culture were examined (e.g., friendship quality, friendship intensity, difficulty getting along with students, etc.), it is possible that if given an opportunity to create measures of peer culture a priori, new measures,

that were not able to be assessed given the current data, may be identified as central components of peer culture.

As previously described, the Add Health study allowed for immediate peer group characteristics to be examined simultaneously with peer culture. While this was an important feature of the Add Health data, one drawback is that there may have been clustered effects of peer groups that were not able to be observed. That is, a three-level hierarchal linear model with students clustered within peer groups, clustered within schools would have been able to account for the fact that students within the same peer group share certain characteristics (a quality that violates the independence assumption associated with regression). However, the nominations provided by students produced such a large number of peer groups within each school that it was not possible to use peer group as a clustering variable.

While study findings should be considered in light of these limitations, the methodological strengths of the study help to counter-balance these limitations and give reason to believe that this study still provides valid, reliable information regarding the peer culture construct. The reasonably large sample sizes of both the 4-H Study and Add Health as well as the fact that findings were replicated across these samples suggests that practitioners, theorists, and researchers can rely on the current study as an initial framework from which the concept of peer culture can be further explored.

Implications

The identification of the role of a peer culture within schools provides information for both policy-makers and researchers from a variety of fields who are interested in improving student achievement and engagement in America's schools. It is important, however, to recognize that peer culture is just one component of a system of interacting contexts within a school that are working to promote student success. Teacher, principals, and parents play pivotal roles in student performance and academic success. As such, the future study of peer culture should consider both its direct role in achievement and engagement and also its role within the larger system of interacting parts that comprises every school.

In all, it is hoped that the continued study of peer culture may lead investigators to consider the role of peer culture in efforts in the development of school reform policy. Strategies aimed at peer culture reform may form one component of a larger-scale school reform effort. Currently, there is a wealth of knowledge available regarding the efficacy of adolescent intervention strategies that compliments the current findings and offers a stepping stone from which researchers and practitioners may begin to incorporate a peer culture component into adolescent intervention and prevention strategies.

For example, in a recent policy report distributed by the Society for Research in Child Development, Kenneth Dodge and colleagues (2006)

summarized research supporting Dishion's theory of iatrogenic effects. The authors identified twenty randomized control trials that suggested youth engaged in more negative behaviors after program participation as a result of peer interactions that occurred during program participation. The programs in which iatrogenic effects were identified seemed to all share a common denominator: a lack of structure and consistent adult supervision. In all, the authors supported the continued funding for youth programming, citing research demonstrating that programs in which youth were engaged in structured, supervised activities can generate positive effects.

Dodge and colleague's report aligns nicely with findings from the current study suggesting that a peer culture defined by high levels of friendship intensity may actually be associated with negative academic outcomes. As previously discussed, higher levels of friendship intensity may suggest that youth are spending a great amount of unstructured time with peers. In line with Dodge's conclusions in the policy report, problems do not arise just because youth are spending time together, rather; it is the quality and type of interactions in which youth are engaging that seem to matter. If students are provided with structured, supervised settings (i.e., sports teams, extracurricular activities, academic clubs, student government, etc.) in which to interact, iatrogenic effects may be reduced.

The alternative model tested also sheds light on our understanding of how peer culture may be part of a larger effort at school reform. According to initial

findings from the alternative model, "mismatched" youth who have a low probability of being in a school with a positive peer culture but, in fact, are enrolled in a school with a positive peer culture demonstrate mixed outcomes. When compared to their counterparts in schools with a negative peer culture, these youth have higher levels of achievement, but lower levels of school engagement. This finding hints at the idea that these students are enrolled in a school that is only partly addressing their needs – while achievement is improved, students may be feeling unengaged and emotionally detached from their schools

An equivalent, "real life" model that mirrors what was tested in the current alternative model would be the Metropolitan Council for Educational Opportunity (METCO) system. In the METCO program, poor urban youth are removed from their local schools and placed in higher achieving schools in wealthy suburbs. According to Canada, and the findings from the current alternative model, this program may produce higher levels of achievement, but ultimately many of the students' needs may not be met. If a community is interested in using peer culture as a mechanism for improving student outcomes, the method should not be to remove students from schools with a negative peer culture and place them in schools with positive peer culture. Rather, just as Geoffrey Canada has done in his Harlem Children Zone schools, parents, teachers, and administrators need to be given tools for creating positive peer cultures within their own schools and communities.

Regardless of whether a researcher or practitioner is interested in implementing interventions that focus on peer culture, the construct and its relationship with student outcomes should be taken into account in future research and policy. The most thoughtfully-designed intervention may be at risk for failure if the peer culture in which it is implemented is working to counteract intervention efforts. In all, this work further attests to the significant role of peers in adolescent academic development and our responsibility as researchers and practitioners to acknowledge and, hopefully utilize this power to improve student outcomes.

Summary

This study provides initial evidence supporting the idea that each school has a unique peer culture that is associated with students' academic achievement and school engagement. Peer culture seems to be comprised of two components – a relational and a behavioral component – which work independently to influence to student outcomes. The relationship between peer culture and student outcomes, like the relationship between most adolescent contexts and adolescent outcomes, is complex and variegated. Behavioral components of peer culture were related to student achievement, but relational aspects of peer culture were not. On the other hand, both relational and behavioral components of peer culture were associated with school engagement. Both of these findings tested within models that controlled for a variety of individual, familial, peer, and school

predictors and were replicated across two data sets, the 4-H Study and Add Health.

   In addition to establishing the validity of the concept of school-wide peer culture, the current study also offered initial insights into the relationship between peer culture and immediate friendship groups. Analyses of the Add Health study revealed that immediate peer group characteristics and peer culture characteristics are significantly related to individual academic outcomes simultaneously. Interaction terms examining the links between peer culture and peer group characteristics were not significant, suggesting that these two peer constructs play important but independent roles in predicting student academic success.

   While this work offers initial support for the current conceptualization of school-wide peer culture, it also highlights the need for additional research in this area. Now that extant data has offered validity to the peer culture construct, an important next step will be to conduct research specifically designed to examine the peer culture construct. This work should include both qualitative assessments of student and teacher opinions and experiences with peer culture, as well as quantitative efforts to design valid, reliable measures of peer culture. Alongside the creation of valid instruments, simultaneous testing of intervention strategies aimed at improving peer culture should be undertaken.

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Table 1. Description of four possible combinations of the relational and behavioral components of peer culture.

	Students' Perceptions of Peer Relationships (Relational Component of Peer Culture)	Behavioral Messages Regarding Academic Achievement (Behavioral Component of Peer Culture)
Scenario 1	Positive	Positive
Scenario 2	Positive	Negative
Scenario 3	Negative	Positive
Scenario 4	Negative	Negative

Table 2. 4-H Study sample description, *N*=1,718

	Distribution (mean (SD) or %)
Individual Characteristics	
Male	45.9%
Female [reference]	54.1%
Age	10.990 (.012)
Race[1]	
White [reference]	51.4%
Hispanic	17.8%
African American	7.6%
American Indian	2.4%
Asian	3.8%
Multiracial	2.9%
Other	1.1%
Mother's Education	13.647 (.087)
Depression	.718 (.012)
Maternal Warmth	2.982 (.027)
Parental Involvement	3.153 (.020)
Academic Competence	2.927 (.017)
Social Competence	2.979 (.016)
Self-Worth	3.121 (.016)
GPA	3.329 (.006)
School Engagement	8.440 (.055)
Friendship Quality	4.245 (.007)
School Characteristics	
Mother's Education	13.687 (.034)
School locale[1]	
Suburban [reference]	45.0%
Urban	25.3%
Rural	29.7%
Title 1 Eligibility	70.9%
GPA	3.329 (.006)
School Engagement	8.463 (.016)
Students Care	3.801 (.010)
Friendship Quality	4.245 (.007)

[1]Because descriptive statistics are based on data from ten multiply imputed datasets, percentages within categories do not add up exactly to 100%

Table 3. Add Health sample description, *N*=11,636

	Distribution (mean (SD) or %)
Individual Characteristics	
Male	49.9%
Female [reference]	50.2%
Age	15.123 (.143)
Race[1]	
White [reference]	70.9%
Hispanic	7.6%
Mexican or Chicano	24.2%
African American	15.5%
American Indian	4.8%
Asian	4.8%
Other	7.7%
Mother's Education	4.413 (.083)
Mother Cares	4.802 (.021)
Depression	.926 (.013)
GPA	2.592 (.034)
School Engagement	2.350 (.022)
Friendship Intensity	3.233 (.051)
School Characteristics	
Mother's Education	4.524 (.063)
School type[1]	
Public [reference]	98.2%
Catholic	1.0%
Private	1.1%
School locale[1]	
Suburban [reference]	53.6%
Urban	28.0%
Rural	18.4%
Percent of parents in PTO	24.674 (2.541)
Percent of teachers with Master's	48.765 (2.700)
GPA	2.608 (.033)
School Engagement	2.448 (.020)
Trouble with Students	1.173 (.028)
Reciprocated best friendships	.376 (.015)
Friendship Intensity	2.901 (.061)

[1]Because descriptive statistics are based on data from ten multiply imputed datasets, percentages within categories do not add up exactly to 100%

Table 4. Identification of "mismatched" students based on probability of attending a school with a positive peer culture and the peer culture of the school where the student is actually enrolled

	Student attends school with positive peer culture	Student does ***NOT*** attend school with positive peer culture
Student has ***high*** probability of attending a school with a positive peer culture	Category 1	Category 2 *(Mismatch)*
Student has ***low*** probability of attending a school with a positive peer culture	Category 3 *(Mismatch)*	Category 4

Table 5. Variance components, intraschool correlation coefficients for school-level measures used in the 4-H Study

	Scale	
	School Engagement	Friendship Quality
Within-person variance	0.790	0.810
Within-school variance	0.040	0.059
Between-school variance	0.213	0.312
Intraschool correlation	0.842	0.840

Table 6. Summary of unstandardized regression coefficients and standard errors for two-level hierarchal linear regression Models 1-3 predicting Wave 2 GPA in the 4-H Study (N=1,718)

	Model 1	Model 2	Model 3
Intercept	3.183***(.118)	3.141***(.076)	3.179***(.040)
Level 1 (Individual)			
Gender (Male)	.154 (.211)	.187 (.139)	.093**(.036)
Age	-0.094**(.031)	-0.094**(.031)	-0.094**(.031)
Race [ref: white]			
Native American	-.261*(.092)	-.212 (.113)	-.261*(.091)
Asian or Pacific Islander	.191*(.076)	.198**(.062)	.191**(.062)
African American	-.072 (.063)	.000 (.064)	.005 (.070)
Latino	-.156**(.045)	-.124*(.051)	-.123*(.048)
Multiracial	-.047 (.080)	-.035 (.079)	-.040 (.079)
Other	.100 (.145)	.059 (.128)	.031 (.122)
Inconsistent	.090*(.044)	-.079 (.045)	-.078 (.045)
Mother's Education	.039***(.006)	.039***(.006)	.050***(.009)
Depression	-.077*(.034)	-.081*(.041)	-.081*(.041)
Maternal Warmth	.019 (.016)	.019 (.016)	.019 (.016)
Parental Involvement	.086***(.019)	.086**(.029)	.086**(.029)
Academic Competence	.083**(.027)	.081**(.030)	.081**(.030)
Social Competence	-.087**(.026)	-.087**(.029)	-.087**(.029)
Self Worth	.051 (.029)	.052 (.033)	.052 (.033)
GPA(5th grade)	.465***(.024)	.467***(.031)	.465***(.031)
School Engagement	.016 (.010)	.016 (.010)	.016 (.010)
Friendship Quality	-.006 (.016)	-.005 (.019)	-.007 (.019)
Level 2 (School)			
Mother's Education		.044***(.014)	.044***(.014)
School Locale [ref: Suburban]			
Urban		.031 (.039)	.044 (.039)
Rural		-.013 (.050)	-.017 (.048)
Title 1 Eligibility		.037 (.028)	.053 (.030)
GPA		.544***(.131)	1.596 (.1.272)
School Engagement		-.041 (.041)	-.049 (.039)
Students Care		.022 (.064)	-.659 (.610)
Friendship Quality		.004 (.107)	1.384 (.918)
GPA*Friendship Quality			-.427 (.289)
GPA*Students Care			.215 (.180)

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 7. Summary of unstandardized regression coefficients and standard errors for two-level hierarchal linear regression Models 1-3 predicting Wave 2 School Engagement in the 4-H Study (N=1,718)

	Model 1	Model 2	Model 3
Intercept	7.894***(.295)	8.083***(.301)	7.941***(.108)
Level 1 (Individual)			
Gender (Male)	.722 (.530)	.426 (.420)	.419 (.421)
Age	-.175 (.102)	-.175 (.102)	-.177 (.093)
Race [ref: white]			
Native American	-1.678**(.243)	-1.497**(.294)	-1.486**(.250)
Asian or Pacific Islander	.913***(.201)	1.069***(.248)	1.080***(.200)
African American	.145 (.156)	.551**(.298)	.596***(.156)
Latino	-.305 (.184)	-.116 (.142)	-.096 (.152)
Multiracial	-.312 (.267)	-.246 (.267)	-.228 (.261)
Other	.656 (.519)	.603 (.449)	.716 (.446)
Inconsistent	-.402**(.111)	-.326*(.143)	-.213**(.106)
Mother's Education	.063**(.022)	.067**(.021)	.067**(.021)
Depression	-.280*(.139)	-.300*(.117)	-.302*(.137)
Maternal Warmth	.106*(.053)	.104 (.053)	.104 (.053)
Parental Involvement	.164*(.075)	.164*(.065)	.164*(.075)
Academic Competence	.202*(.092)	.190*(.091)	.190*(.090)
Social Competence	-.048 (.074)	-.052 (.087)	-.053 (.075)
Self Worth	.023 (.116)	.024 (.098)	.025 (.117)
GPA(5th grade)	.305***(.080)	.319***(.080)	.320***(.080)
School Engagement	.312***(.030)	.311***(.025)	.311***(.025)
Friendship Quality	.149**(.049)	.155**(.053)	.155**(.053)
Level 2 (School)			
Mother's Education		.087(.052)	.113**(.035)
School Locale [ref: Suburban]			
Urban		.182 (.174)	.187 (.106)
Rural		.022 (.140)	-.014 (.102)
Title 1 Eligibility		-.018 (.151)	.111 (.091)
GPA		.558(.340)	.597*(.237)
School Engagement		.301*(.135)	.775 (.996)
Students Care		-.373(.282)	1.375 (1.345)
Friendship Quality		.829*(.322)	.023 (2.753)
GPA*Students Care			-.217 (.150)
GPA*Friendship Quality			.097 (.314)
School Engagement*Students Care			-.318 (.250)
School Engagement*Friendship Quality			.007 (.014)

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 8. Variance components, intraschool correlation coefficients for school-level measures used in Add Health

	Scale	
	School Engagement	Friendship Intensity
Within-person variance	0.852	0.813
Within-school variance	0.001	0.002
Between-school variance	0.001	0.015
Intraschool correlation	0.926	0.882

Table 9 .Summary of unstandardized regression coefficients and standard errors for two-level hierarchal linear regression Models 1-4 predicting GPA in Add Health (N=11,636)

	Model 1	Model 2	Model 3	Model 4
Intercept	2.283***(.377)	2.239***(.327)	2.210***(.323)	2.167***(.327)
Level 1 (Individual)				
Gender (Male)	.169(.202)	.166(.074)	.182(.170)	.196(.169)
Age	.036(.039)	.036(.036)	.039(.037)	.040(.037)
Sex*Age	-.001(.012)	-.001(.010)	-.002(.009)	-.033(.010)
Race [ref: white]				
Hispanic	-.073(.080)	-.060(.077)	-.042(.075)	-.041(.075)
Mexican or Chicano	.065(.163)	.066(.161)	.082(.163)	.083(.164)
African American	-.224**(.068)	-.207*(.073)	-.192*(.072)	-.189*(.072)
American Indian	.042(.077)	.038(.077)	.036(.080)	.038(.081)
Asian	.085(.010)	.080(.097)	-.040(.050)	.085(.100)
Other	-.040(.050)	-.041(.420)	.032(.045)	-.040(.050)
Mother's Education	.030(.045)	.030(.045)	.030(.045)	.032(.045)
Mother Cares	.522(.238)	.521(.239)	.532(.241)	.532(.241)
Depression	-.093*(.035)	-.093*(.035)	-.089*(.035)	-.089*(.035)
GPA	.622***(.072)	.624***(.072)	.598***(.077)	.598***(.077)
School Engagement	.046(.023)	.046(.022)	.052(.026)	.053(.026)
Friendship Intensity			-.005(.011)	-.005(.012)
Peer Group GPA			.082**(.027)	.083**(.026)
Peer Group School Engagement			-.034(.040)	-.034(.039)
Level 2 (School)				
Mother's Education		.076(.054)	.074(.052)	.071(.327)
Private School		.134(.150)	.123(.151)	.161(.150)
School Locale [ref: Suburban]				
Urban		.054(.047)	.050(.046)	.077(.047)
Rural		-.019(.056)	-.023(.061)	.013(.053)
Parents in PTO (%)		-.001(.001)	-.000(.001)	-.000(.001)
Teachers with Master's (%)		-.003(.001)	-.000(.000)	-.000(.000)
GPA		.621***(.099)	.620***(.100)	.535**(.149)
School Engagement		.189(.191)	.182(.190)	.210(.195)
Students trouble getting along		.007(.134)	-.000(.128)	-.533(.326)
Reciprocated best friendships		.281(.242)	.282(.244)	.282(.244)
Friendship Intensity		-.017(.065)	-.018(.063)	.363(.378)
GPA*Friendship				-.144(.132)

Intensity	
GPA*Reciprocated best friendships	.258(.655)
GPA*Students trouble getting along	.185(.121)

*p < .05, ** p < .01, *** p < .001*

Table 10. Summary of unstandardized regression coefficients and standard errors for two-level hierarchal linear regression Models 1-4 predicting School Engagement in Add Health (N=11,636)

	Model 1	Model 2	Model 3	Model 4
Intercept	2.264***(.324)	2.360***(.341)	2.374***(.343)	-.020(.207)
Level 1 (Individual)				
Gender (Male)	.027(.228)	-.001(.208)	-.002(.210)	.029(.020)
Age	-.024(.023)	-.026(.021)	-.027(.020)	-.029(.020)
Sex*Age	-.003(.014)	-.001(.012)	-.002(.013)	.000(.012)
Race [ref: white]				
Hispanic	-.149**(.052)	-.152**(.050)	-.176**(.051)	.172**(.050)
Mexican or Chicano	-.283*(.102)	-.285*(.101)	-.304*(.103)	-.304*(.103)
African American	.301***(.039)	.290***(.041)	.266***(.038)	.267***(.039)
American Indian	-.063(.053)	-.061(.053)	-.061(.054)	-.063(.056)
Asian	'-.024(.083)	-.023(.082)	-.031(.076)	-.032(.075)
Other	.037(.054)	-.038(.054)	.036(.054)	.036(.053)
Mother's Education	-.165***(.013)	-.164***(.013)	-.166***(.012)	.166***(.013)
Mother Cares	-.439**(.127)	-.439**(.127)	-.453**(.123)	-.453**(.128)
Depression	.059**(.021)	.060**(.022)	.055*(.023)	.055*(.022)
GPA	.133**(.033)	.132**(.033)	.164***(.034)	.163***(.034)
School Engagement	.443***(.020)	.443***(.019)	.431***(.022)	.432***(.022)
Friendship Intensity			-.002(.013)	-.002(.013)
Peer Group GPA			-.090**(.030)	-.090**(.030)
Peer Group School Engagement			.083***(.030)	.083***(.030)
Level 2 (School)				
Mother's Education		-.081(.044)	-.075(.042)	-.073(.040)
Private School		-.052(.085)	-.069(.080)	-.043(.081)
School Locale [ref: Suburban]				
Urban		-.020(.046	-.022(.046)	-.016(.045)
Rural		.012(.055)	.005(.046)	.010(.046)
Percent of parents in PTO		.000(.000)	.000(.000)	.000(.000)
Percent of teachers with Master's degree		.000(.000)	.000(.000)	.000(.000)
GPA		.147(.096)	.130(.096)	.129(.092)
School Engagement		.529***(.110)	.532***(.108)	.653(.442)
Students have trouble getting along		.068(.111)	.068(.104)	.082(.100)
Reciprocated best friendships		-.528***(.130)	-.547**(.138)	.244(1.26)

Friendship Intensity	.170**(.058)	.165**(.056)	.157(.395)
School Engagement* Reciprocated best friendships			-.258(.537)
School Engagement* Friendship Intensity			.004(.158)

* *p* < .05, ** *p* < .01, *** *p* < .001

Note: Lower school engagement scores correspond to higher levels of school engagement

Figure 1. Conceptual model of the role of individual, peer, and school
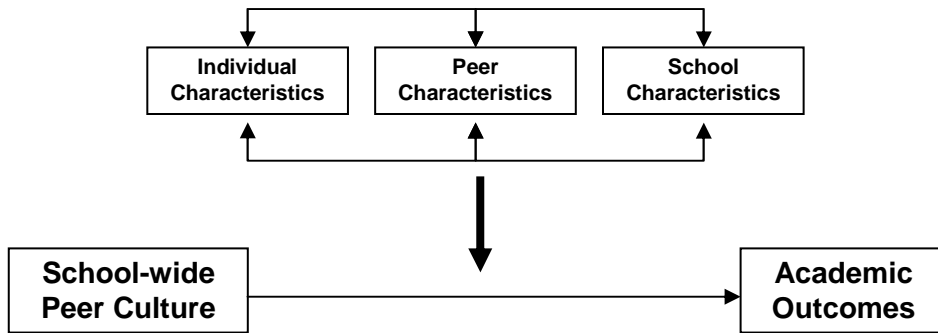characteristics in the relationship between peer culture and academic outcomes

Figure 2. Example of a hypothesized interaction between relational and behavioral peer culture and its relation to individual GPA